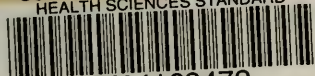


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OBSTETRICS.

A MANUAL FOR STUDENTS AND PRACTITIONERS.

BY

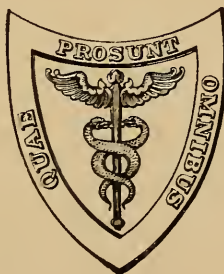
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PREFACE.

IN the writing of this Compend the object sought has been to place before the student the most important matter in the subject of Obstetrics in as condensed a manner as possible. Much has been omitted in the way of theories and obscure or disputed points, which are appropriate only in an extended textbook.

Brief manuals have a position of unquestionable value to the student and practitioner, provided the text is clear, accurate, and well proportioned to the importance of the many subjects necessary to a practical comprehension of the whole. These requisites have been borne in mind in the preparation of the present volume.

In its compilation the following works have been consulted, as well as notes taken at the lectures of Dr. James W. McLane of the College of Physicians and Surgeons, New York City: Charpentier's *Cyclopædia of Obstetrics and Gynecology*, Hirst's *System of Obstetrics*, Playfair, Winckel, Lusk, and King.

The illustrations are taken from Playfair and King.

CHAS. W. HAYT. M. D.

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New York City. }

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OBSTETRICS.

CHAPTER I.

FEMALE ORGANS OF GENERATION.

Name and describe the external organs of generation.

They are organs essentially intended for copulation, and consist of—

1. The *Mons Veneris*, which is a firm cushion-like eminence above the pubes, composed of skin, fat, connective tissue, blood-vessels, and nerves. It has many sebaceous and sweat-glands upon it, and is covered with hair. Its use is as a cushion for the male during copulation and to prevent injury from blows. There is no mons until puberty (Fig. 1, *f*).

2. The *Labia Majora* are the external or great lips. They are two folds of skin extending from the median line of the mons veneris anteriorly, to terminate posteriorly in what is called the fourchette, which is situated at the anterior portion of the perineum, and is nearly always torn at the first labor. They are made up of adipose tissue, blood-vessels, and nerves, and have both a cutaneous and mucous covering. Deeply within them are situated the vulvo-vaginal glands. In the virgin the labia majora are in apposition, but after childbirth they become more or less separated (Fig. 1, *a*).

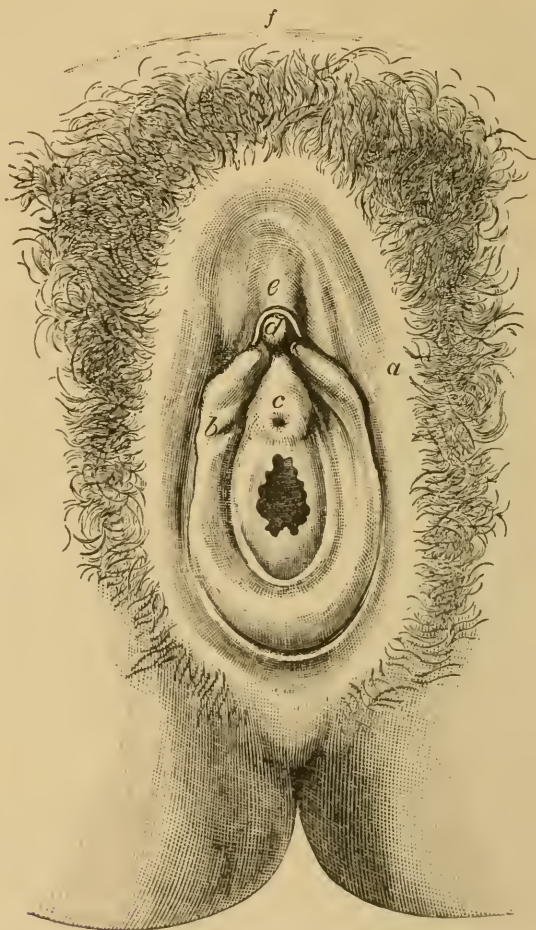
3. The *Labia Minora*, or Nymphæ, are the internal or lesser lips. They are two moist folds of mucous membrane seen in separating the labia majora. They arise by two roots. The superior pair are thick and fleshy, and together form the hood or prepuce of the clitoris. The inferior pair are thin, and form the frenum of the clitoris. In very young children the nymphæ project beyond the vulva (Fig. 1, *b*).

4. The *Clitoris* is a reddish tubercle situated about half an inch behind the anterior commissure of the labia majora. It is made up of the glans clitoridis and the two corpora cavernosa, which are separated from each other by a fibrous septum. The nerve-supply is large, and on this account it is supposed to be the chief seat of voluptuousness in the female (Fig. 1, *d*).

5. The *Vestibule* is a triangular surface bounded by the nymphæ on either side and the clitoris above (Fig. 1, *c*).

6. The *Meatus Urinarius* is the external orifice of the urethra, and is situated at the base of the vestibule. Immediately below it is a small tubercle which terminates the superior wall of the vagina. This arrangement allows the meatus to be found on examination without exposing

FIG. 1.



External Organs of Generation: *a*, labium majus; *b*, labium minus; *c*, vestibule above urethral orifice; *d*, glans clitoridis; *e*, preputium clitoridis; *f*, mons veneris.

the woman. After confinement, however, the swelling of the parts sometimes renders the finding of this tubercle difficult, and makes catheterization not easy even though the genitals be exposed. For this reason the best and proper procedure is to separate the labia with the thumb and index finger and introduce the catheter by sight.

7. The *Hymen* is situated at the orifice of the vagina, and is formed from vaginal mucous membrane. It contains a variable-sized opening through which passes the menstrual fluid. After the first labor three or four eminences are left which are called “*carunculæ myrtiformes*.”

8. The *Vagina* is a musculo-membranous canal lying wholly within the true pelvis, and extending from the vulvar orifice to the uterus. It is in relation anteriorly with the bladder and posteriorly with the rectum. Its length varies, the anterior wall averaging from $2\frac{1}{2}$ to 3 inches, the posterior from 3 to $3\frac{1}{2}$ inches. It is made up of three layers—an external or cellular, middle or muscular, and internal or mucous coat. This latter is thrown into numerous folds or *rugæ*, which become greatly atrophied in multiparæ and the aged, but never entirely disappear. In the virgin the anterior and posterior walls are in apposition.

What constitute the internal organs of generation? Describe each.

1. The *Uterus*, or *Womb*, is situated in the true pelvis, above the vagina and between the bladder in front and the rectum behind. It is the organ in which the fecundated ovule is developed, and which expels the foetus when the term of pregnancy arrives. The adult nulliparous uterus is about 3 inches long, 2 inches broad at the fundus, and 1 inch thick. Its weight is from 7–12 drachms. It is divided into three regions: the fundus, being that part above the Fallopian tubes; the body, between the tubes and the os internum; the cervix or neck, extending from the os internum to the os externum. It presents two surfaces and two borders, and is made up of three coats: first, an external or peritoneal; second, the middle or muscular layer, which consists of unstripped muscular fibre; and third, an internal lining of mucous membrane (also called *musculus granulosus*), which terminates below at the internal os. It is held in position by the vagina below, two vesico-uterine ligaments anteriorly, two recto-uterine ligaments posteriorly, two broad ligaments laterally, and two round ligaments passing from the superior angle of the uterus to the labia majora.

2. The *Fallopian Tubes*, or *Oviducts*, are two trumpet-shaped tubes from 4 to 5 inches in length, passing from the superior angles of the uterus to the ovaries. Through these ducts the semen is brought in contact with the ovule and the ovule is carried into the cavity of the uterus. They also are composed of three coats—an external serous, middle muscular, and internal mucous.

3. The *Ovaries*, the germ-producing organs of the female, are two small ovoid bodies situated on either side of the uterus in the posterior fold of the broad ligament and at the end of the Fallopian tubes. Their size and weight vary with age, but in general the dimensions are $1\frac{1}{2} \times \frac{3}{4} \times \frac{1}{4}$ inch. and they weigh about 90 grains. The ovary consists of a spongy, reddish mass called the stroma or medullary portion. This is made up of connective tissue, muscular fibres, and vessels. Externally, it is thicker, more compact, of a whitish color, and is called the “*tunica*

albuginea." This is covered by an epithelial layer derived from the peritoneum.

THE PELVIS.

What is the pelvis, and how is it made up?

The *Pelvis* is a bony basin situated at the lower part of the trunk. It rests below upon the femurs, supports the vertebral column, and forms a canal through which the child passes to be delivered from the uterus of the mother. It is formed of four bones—the sacrum, coccyx, and two innominate bones.

Name the ligaments connected with the pelvis.

Two anterior sacro-iliac ligaments connecting the anterior surfaces of the sacrum and ilia; two posterior sacro-iliac ligaments between the sacrum and ilia posteriorly; two great sacro-sciatic ligaments passing from the sacrum and ilium to the ischium; two lesser sacro-sciatic ligaments passing from the ischium to the sacrum and coccyx; anterior, posterior, and lateral sacro-coccygeal ligaments between the sacrum and coccyx; anterior, posterior, and superior pubic and subpubic ligaments between the two pubic bones.

State what is understood by the true pelvis.

The true pelvis is that part of the pelvic cavity situated below the ilio-pectineal lines. This is in contradistinction to the false pelvis, which is the broad expanded portion above these lines, and is of practically no importance from an obstetrical point of view. The upper opening of the true pelvis is called the superior strait, inlet, or brim, and is heart-shaped; the lower opening is called the outlet or inferior strait, is somewhat oval, and is bounded by the tuberosities of the ischia, the coccyx, and rami of the pubes.

What are the diameters of the pelvis?

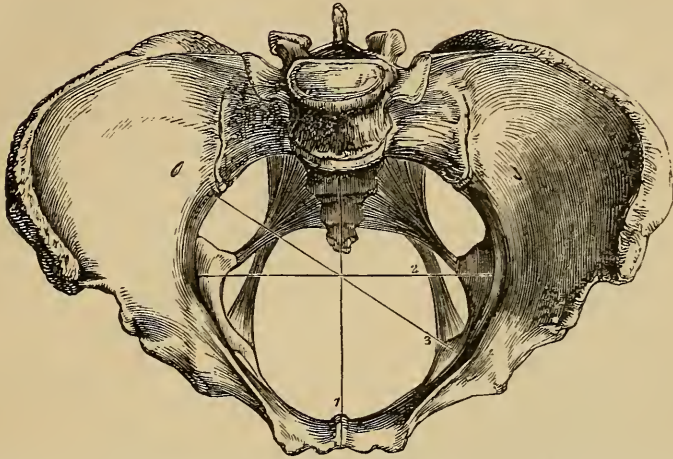
They are measurements taken between various points directly opposite each other, and are three in number: 1st, the antero-posterior or conjugate; 2d, the oblique; 3d, the transverse. The conjugate at the brim is 4 inches, and is taken from the centre of the promontory of the sacrum to the posterior surface of the symphysis. At the outlet this diameter is 5 inches. The measurement here is taken from the tip of the coccyx to the lower border of the symphysis (Fig. 2, 1).

The oblique is $4\frac{1}{2}$ inches both at the brim and at the outlet. At the brim this measurement is taken from the sacro-iliac synchondrosis of one side to the ilio-pectineal eminence of the other; at the outlet, from the centre of the great sacro-sciatic ligament to the point of junction of the ascending ramus of the ischium with the descending of the pubis (Fig. 2, 3).

The transverse is 5 inches at the inlet, and is the measurement from a point midway between the sacro-iliac joint and the ilio-pectineal eminence to a corresponding point on the opposite side (Fig. 2, 2). At the outlet

this diameter is 4 inches, and is the distance between the tuberosities of

FIG. 2.



The Pelvis: 1, Antero-posterior or Conjugate Diameter; 2, Transverse; 3, Oblique.

the ischia. (There are a few other measurements sometimes given, but they are of little importance, and therefore are omitted.)

How many true planes are there in the pelvis? Name them and give their direction.

There are four—two anterior and two posterior “*inclined*” planes. The anterior have a direction from above downward, from behind forward, and from without inward; the posterior from above downward, from before backward, and from without inward.

What are the differences between the male and female pelvis?

The real differences are found in the true pelvis, and are determined by the presence of the uterus.

Female.

Shallow, but capacious.

Light in structure, and the points for muscular attachments are much less developed.

Subpubic angle 75° .

Male.

Deep.

Bones stronger, heavier, rougher, and more compact.

Pelvis more conical. Sacrum less concave. Ischial tuberosities closer together. Subpubic angle more acute, 58° .

What alterations take place in the pelvis during pregnancy?

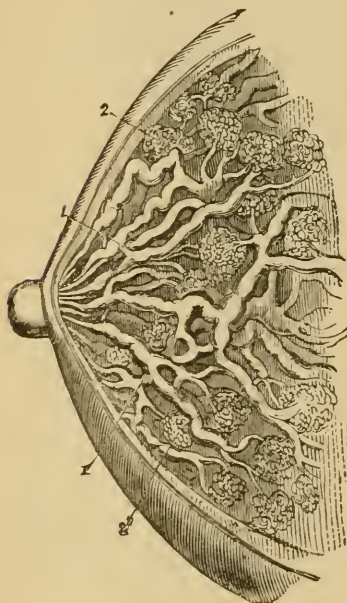
The cartilages become softened and swollen and the ligaments relaxed. This makes the pelvis more spacious.

THE BREASTS.

Describe the mammary glands or breasts.

The *Mammæ*, or breasts, are two glandular organs connected with the generative apparatus, which secrete the fluid destined to nourish the child. They are situated on the anterior and superior part of the chest, in front of the pectoralis major and between the third and seventh ribs. They are conical or hemispherical in shape in the nulliparous woman, but vary greatly both in size and form in women who have nursed. Anomalies in position are sometimes observed.

FIG. 3.



1, Galactophorous Ducts; 2, Lobuli of the Mammary Gland.

The external surface has three zones: (1) A white peripheral zone, smooth and soft, reaching from the periphery to the areola. (2) An areolar zone extending to the nipple. This is of a pink or rosy hue in blonds; in brunettes nearly brown. During pregnancy this zone becomes dark and pigmented. (3) The nipple, or "teat," a large papilla situated at the summit of the gland.

The mammæ are made up of gland-tissue and fat. Each gland contains fifteen or twenty lobes separated by fibrous septa and by adipose tissue. The lobes are subdivided into lobules, which are produced by the aggregation of acini, in which the milk is formed. As the ducts of the lobes approach the nipple they become widely dilated, so as to form small reservoirs in which milk is

stored. But as they pass through the nipple they again contract. The breast receives a large number of both superficial and deep vessels and nerves, and its sympathetic relations with the uterus are very strongly marked, as is shown after delivery by the fact that the nursing of the child produces reflex contractions of the uterus and sometimes severe after-pains.

CHAPTER II.

THE GRAAFIAN FOLLICLES, OVULATION, AND MENSTRUATION.

THE GRAAFIAN FOLLICLES.

What are the Graafian follicles?

They are small spherical vesicles situated in the stroma of the ovary. At the age of about twenty there are some 350,000 to each ovary. From this time on they steadily decrease in number. They are formed of two membranes—the external, very vascular and made up of connective tissue called the “tunica fibrosa;” the internal, composed of connective

FIG. 4.

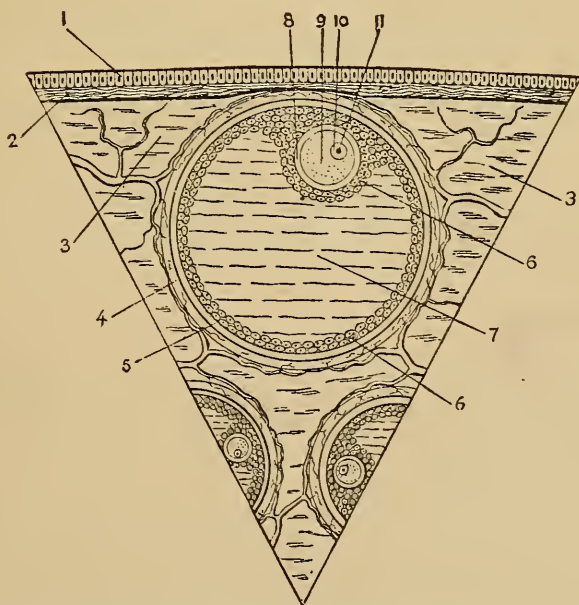


Diagram of a Triangular Portion cut from the Stroma of the Ovary: 1, epithelial covering of ovary; 2, tunica albuginea; 3,3, ovarian stroma; 4, tunica propria of 5, Graafian follicle; 6,6, membrana granulosa; 7, liquor folliculi; 8, zona pellucida; 9, yolk; 10, germinal vesicle; 11, germinal spot (King).

tissue called the “tunica propria.” The inner surface of the latter is lined with a layer of small round nucleated cells, the “membrana granulosa.” These cells become denser at one point, and form the “discus” or “cumulus proligerus.” The cavity of the follicle is filled with a clear, viscid liquid, the “liquor folliculi.”

Describe the contents of the Graafian follicle.

The Graafian follicle contains, besides the liquor folliculi, a small body about $\frac{1}{125}$ of an inch in diameter, the "ovule." This is surrounded by the cells forming the discus proligerus, and its envelope is a thick, elastic, transparent membrane, which has been termed the vitelline membrane or zona pellucida. The cavity of the ovule is filled with a granular liquid, the "vitellus," or yelk, in which is found the vesicle of Purkinje, or germinal vesicle, containing the germinal spot. From without inward we thus find—(1) the tunica fibrosa; (2) the tunica propria; (3) the membrana granulosa; (4) the discus proligerus; (5) the liquor folliculi (these compose the Graafian follicle); (6) the zona pellucida; (7) the yelk; (8) the germinal vesicle; (9) the germinal spot, the ovule (Fig. 4).

OVULATION AND MENSTRUATION.**What is puberty?**

Puberty is the period of transformation from childhood to youth, and is the time when fecundation is rendered possible. This period varies considerably in different climates and individuals, but averages twelve years in females and fourteen in males.

Describe briefly the changes occurring in the female when puberty is reached.

The pubis becomes covered with hair, the pelvis wider, the thighs broader, and the breasts larger. The character also changes materially. This transformation is indicated by the appearance of two functions carried on by the female generative organs—namely, ovulation and menstruation.

What is nubility?

Nubility is the age when fecundation is rendered possible, and the consequence borne normally without damage. It is generally considered the period of puberty, but this is erroneous, since, though puberty must precede it, a girl may be pubescent without being nubile.

What is the menopause?

The *Menopause*, or *change of life*, is the time when menstruation ceases. Like puberty, the menopause occurs at a very variable period of life, the average being at the forty-third or forty-fourth year, though cases have been known in which menstruation lasted until the sixty-fifth year. The menopause has been known to occur as early as twenty-eight. It does not take place suddenly, but begins by irregularities in the flow in regard to duration, quality, and quantity, and at last the flow ceases altogether. At the same time some general ailments appear and the genital organs become atrophied.

What is understood by the term "ovulation"?

By *Ovulation* we mean the phenomena accompanying the formation of the ova in the ovary, the rupture of the Graafian follicle, and the dis-

charge of the ovum from the vesicle. This last is followed by the migration of the ovum through the tube, the cicatrization of the Graafian follicle, and the production of the corpus luteum.

What does the term "menstruation" mean?

Menstruation is the periodical discharge of blood and mucus from the female organs of generation, generally occurring every lunar month, excepting during pregnancy and lactation, when it is usually suppressed. This function is established at puberty and ceases at the menopause.

The menstrual blood is acid in reaction, has a slight odor, is prevented from coagulating by the mucus contained in it, and varies greatly in amount in different individuals. The source of the blood is the mucous membrane lining the uterus. The purpose of the menstrual flow is simply to prepare a germ-bed for the reception of the impregnated ovum.

What is the relation between ovulation and menstruation?

The flow probably begins with the rupture of the Graafian follicle, and continues a variable number of days, ordinarily about four. Undoubtedly, ovulation may take place without its outward manifestation (menstruation), as many cases are recorded where impregnation has occurred during lactation and before menstruation had been re-established. However, they usually go together.

What is the corpus luteum?

The *Corpus Luteum* is a small yellowish mass left in the ovary after the rupture of one of the Graafian follicles. It was once supposed to be a sign of previous impregnation, but is found in unquestionable virgins.

Describe the corpus luteum when pregnancy has not taken place.

When a Graafian follicle is about to rupture, a short time before the menstrual flow begins, it increases in size and approaches the surface of the ovary until it forms a projection upon it. The distension is due to an increase of its contained fluid. Now, an escape of blood from the distended capillaries of its inner coat occurs, and the follicle ruptures, as does also the ovarian covering; the ovule passes to the surface of the ovary and into the fimbriated extremity of the Fallopian tube. The internal layer of the follicle now becomes the seat of an hypertrophy due to the development of the cells which compose its tissues. The edges of the rent in the internal layer, on account of this hypertrophy, come in contact; the external layer, being elastic, retracts, and the corpus luteum results. The vessels now begin to disappear, the cells to vanish, and the whole mass is reduced to a small cicatrix, which generally disappears in from thirty to forty days (Longet).

Describe the corpus luteum when pregnancy has taken place.

All of the above changes occur, excepting in a more marked degree. Instead of disappearing in thirty or forty days, as is the case when im-

In the female :

- Abnormal formation of the genitals ;
- Displacements of the uterus, obstructing the ascent of the semen ;
- Vaginal or uterine secretions rendered so strongly acid or alkaline by disease that the spermatozooids are destroyed ;
- Tubal and ovarian diseases.

Describe the changes which take place in the impregnated ovum during its passage to the uterus.

As the ovule escapes from the ovary it takes with it some particles of the discus proligerus, which surround it as a thin layer of granular cells. By friction with the sides of the tube these disappear, and the zona pellucida is the outermost covering. It has now advanced some distance along the tube, and becomes invested with a covering of albuminous material. During this time the vitellus or yelk shrinks from its covering and the germinative vesicle disappears. The first indication of impregnation occurs when a small, clear vesicle appears in the centre of the yelk. This is called the "vitelline nucleus," and is found in fifteen to thirty hours after fecundation. Now what is called segmentation of the yelk takes place. This consists in a breaking up of the vitellus. First, the vitelline nucleus divides into two nuclei, and then the yelk into two halves. The process continues: the two new cells are converted into four, the four into eight, and so on until a great number are generated. This forms a granular mass which from its resemblance to a mulberry is called the "muriform body" or "morula." A clear fluid then accumulates in the centre, expanding the muriform body and pushing the cells together until their edges meet, forming an internal lining to the zona pellucida. This is the "blastodermic membrane," and from it the foetus is developed. The ovum is now $\frac{1}{25}$ th of an inch in diameter, and has occupied about twelve days in its passage from the ovary to the uterus, which it has reached.

What changes occur in the uterine mucous membrane to prepare it for the reception of the impregnated ovum ?

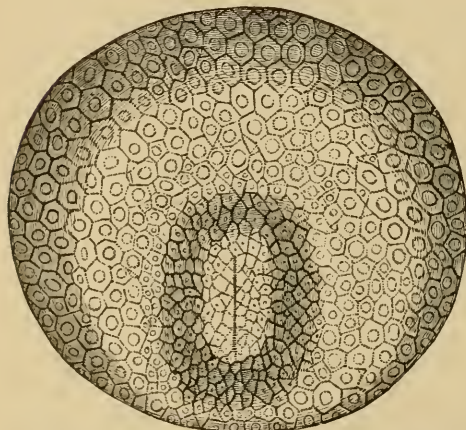
At each menstrual period the mucous membrane of the uterus becomes thickened and vascular, and when fecundation has occurred this change is much more marked, until the result is the formation of a distinct membrane which has received the name of the "decidua." This has three divisions: (1) The "decidua vera," lining the entire uterine cavity, and undoubtedly the hypertrophied mucous membrane of the uterus. (2) The "decidua reflexa," which surrounds the ovum, and is probably simply a growth of the decidua vera around the ovum at the point where it lies in the uterus. As the ovum grows this naturally stretches until it eventually (at the fourth month) comes in contact all around with the decidua vera. (3) The "decidua serotina," which is that part of the decidua vera on which the ovum rests. At this point the placenta is developed. Thus it is seen that the three deciduæ be-

come and really are one. Late in pregnancy fatty degeneration of this structure occurs, its adhesions to the uterine wall lessen, and it is thrown off with the placenta after labor, leaving a new mucous membrane lining the uterus.

Describe the development of the ovum after it has reached the uterus.

The blastodermic membrane divides into three parts: an external, called the "epiblast;" a middle, called the "mesoblast" or "mesoderm;" and an internal, the "hypoblast" or "entoderm."

FIG. 5.



External Surface of Epiblast, showing area germinativa, area pellucida, and primitive trace.

At this time a minute elevation, due to an aggregation of cells, and consisting of a slight thickening of the membrane, appears. This is the "area germinativa." In its centre a faint line is seen, "the primitive trace" or "embryonic line." Surrounding it are a few translucent cells, which have been called the "area pellucida" (Fig. 5). The extremities of the primitive trace thicken and turn upon themselves—one anteriorly, called the cephalic or head fold; one posteriorly, the caudal or tail fold. The body of the embryo is now visible.

What organs or parts of the foetus are developed from the epiblast?

The epiblast takes part in the formation of the superficial layer of the skin, hair, nails, organs of special sense, the brain, spinal cord, and amnion.

What parts are developed from the mesoblast?

From the mesoblast are formed the bony framework, the muscular and vascular system, the muscular and fibrous tissues of the digestive tract, and probably the genito-urinary organs.

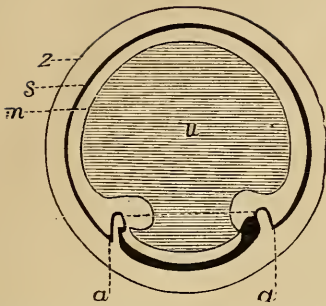
What is developed from the hypoblast?

From the hypoblast is formed the epithelium lining the respiratory and digestive tracts.

Describe the umbilical vesicle.

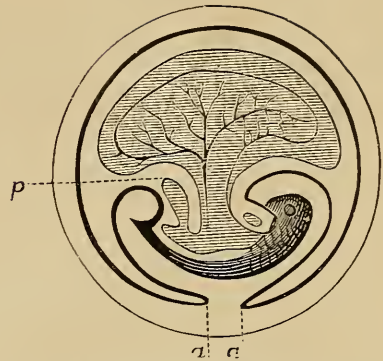
The *Umbilical Vesicle* is a small round sac communicating with the

FIG. 6.



a, a, projecting folds of amnion; *z*, zona pellucida; *s*, epiblast; *m*, hypoblast; *u*, umbilical vesicle.

FIG. 7.



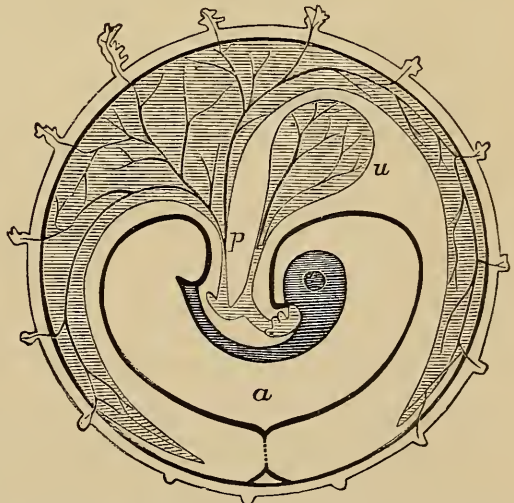
a, a, folds of amnion about to join; *p*, commencement of allantois.

abdominal cavity of the foetus through a constricted portion called the "vitelline duct," and containing a yellowish, oily fluid from which the foetus derives its nourishment during the first few weeks of life. It attains its greatest development by the end of the fourth week. From this time on it gradually shrinks until by the sixth or seventh week it has entirely disappeared. It is formed from the internal layer of the blastodermic membrane.

What is the allantois?

It is a small vesicle derived from the entoderm and inner stratum of the mesoderm, formed about the twentieth day near the caudal extremity of the foetus, and lying between the amnion and chorion. It is connected with the bladder by the urachus, and grows rapidly until it entirely lines the chorion. This contains the two umbilical arteries derived from the aorta, and two umbilical veins, one of which soon disappears. Its caudal part helps to form the umbilical cord.

FIG. 8.



Further Development: *a*, junction of amniotic folds; *p*, pedicle of allantois; *u*, umbilical vesicle.

Describe the amnion.

The *Amnion* is the innermost of the two membranes surrounding the foetus. Externally it is in contact with the chorion, internally with the liquor amnii and foetus. It also forms a covering for the umbilical cord, and is continuous with the integument at the umbilicus of the foetus. It is formed from the epiblast, and secretes a fluid which distends its cavity. This is called the "liquor amnii," and in it the foetus floats.

What is the character of the "liquor amnii"? and what are its uses?

It is, in the early months of pregnancy, a clear, transparent fluid, consisting of water, albuminous matter, and various inorganic salts. Later it becomes denser and of a brownish color, having a faint odor. It prevents injury to the child from blows received on the abdomen of the mother. It also prevents injury to the uterus which the foetus might inflict by its movements. Lastly, it acts as a fluid wedge which dilates the os during labor and lubricates the parturient canal for the passage of the child.

Describe the chorion.

The *Chorion* is the more external of the true foetal membranes. It is a closed sac, formed by the external layer of the blastodermic membrane and the zona pellucida. Externally it is in contact with the decidua, and internally with the amnion. Its internal surface is smooth and shining, while the external surface is rough, being covered with small villi.

What are the chorionic villi?

They are small, hollow sprouts springing from the external surface of the chorion and burying themselves in the decidua. At first non-vascular, later (when the allantois has spread itself over the whole of the chorion) each villus receives an artery and vein, which give branches to the subdivisions into which the villi divide. Soon all, excepting those in contact with the decidua serotina, begin to shrivel up and disappear, until by the end of the eighth week none are left excepting at this site. Occasionally one remains on the surface of the chorion, causing hemorrhage after the birth of the child.

What is the placenta, and how is it formed?

The *Placenta*, or after-birth, whose function it is to aerate the blood of the foetus, is a soft, spongy, vascular mass, circular in form and thickest at its centre. It is from 6 to 9 inches in diameter, from $\frac{1}{2}$ to 1 inch thick in the centre, and weighs from 1 to $1\frac{1}{2}$ pounds avoirdupois. It begins to be formed at the second month, but does not reach its full development until the third month. Its usual attachment is to some part of the uterus near one of the Fallopian tubes, though it may be situated anywhere within the uterine cavity. It is formed of from fifteen to twenty tufts or villi, and has two surfaces—an external uterine or ma-

ternal, which is rough and in contact with the uterine wall; and an internal or foetal: this is smooth, and covered by the two membranes, the amnion and chorion. Each tuft is extremely vascular, and its vessels lie in close apposition with the maternal vessels within the walls of the uterus.

What is the umbilical cord?

The *Umbilical Cord* is the pedicle attaching the foetus to the placenta. It is formed about the fourth week of gestation, and consists of two arteries and one large vein, which pass in a spiral direction from the umbilicus of the child to some portion of the placenta, most frequently about its centre. Surrounding the vessels is a soft, transparent, gelatinous substance called Wharton's jelly, and around this the amnion. The length of the cord varies: averaging from 18 to 20 inches, it has been found 60 to 80 inches in length, and as short as 6 or 8 inches. In thickness it varies from the size of the little finger to that of the thumb or even larger.

THE FŒTUS.

Describe the foetus.

1. At the end of the fourth week it is a small gelatinous mass, curved upon itself and grayish in color. No extremities or head can be seen, and it is so small that it is usually lost in the blood-clots when an abortion occurs at this time.

2. At the end of the second month it is from 1 to $1\frac{1}{2}$ inches in length. The head is large, forming at least one-third of the embryo. The eyes are marked by two black spots and the ears by slightly projecting rings. The mouth is very large, but small folds of skin have appeared about it and the eyes, marking the commencement of the lips and eyelids. The limbs are visible, with rudimentary toes and fingers, and the bends at the elbows and knees are present. The spinal column is divided into vertebræ, and the circulatory system is forming. The umbilical cord is, as a rule, straight and inserted into the lower part of the abdomen. Centres of ossification in some of the bones have appeared.

3. At the end of the third month. From now on the embryo is commonly spoken of as the foetus. It is from $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in length, and weighs about 1500 or 1600 grains. The head is still comparatively large and the eyes prominent, though they and the mouth are closed. The neck becomes evident, the fingers distinctly separated, and the integument thin, transparent, and rose-colored, though firmer than it has been. The genito-urinary organs are developed and the sex can be distinguished. The placenta now is distinctly formed.

4. At the end of the fourth month the foetus measures 6 to 7 inches in length, and weighs between 5 and 6 ounces avoirdupois. The chin, which until now has been inconspicuous, becomes prominent. The nails appear, and soft white hairs are found on the head. The umbilicus is just above the pubes.

5. At the end of the fifth month the length of body is 8 to 10 inches, and the weight is about 9 ounces. The skin is much firmer, and sebaceous matter appears on its surface in small areas. The small intestine contains meconium. The umbilicus is some distance above the pubes.

6. At the end of the sixth month the average length is about 12 inches. The weight now is very variable, but is in the neighborhood of 1 pound. Eyelashes and eyebrows have begun to appear, and the skin has become darker and firmer. The testicles or ovaries are still in the abdominal cavity. According to some, a child born at this period is viable.

7. At the end of the seventh month the foetus is from 12 to 15 inches long and weighs from $2\frac{3}{4}$ to $4\frac{1}{2}$ pounds. The eyelids, which have been closed since the fourth month, now open. The skin is firmer and lighter in color than at the end of the preceding month, and is covered with sebaceous matter. The testicles have descended to the inguinal ring, and may have entered the canal. This is probably the earliest period at which the child can be born with a reasonable chance of surviving.

8. At the end of the eighth month the foetus is from 15 to 18 inches long and weighs from $4\frac{1}{2}$ to $5\frac{1}{2}$ pounds. The nails have reached the finger-tips and the testicles are in the scrotum.

9. At the ninth month, or full term, the foetus weighs, on an average, $6\frac{1}{2}$ to 7 pounds, and measures from 18 to 22 inches in length. The cellular tissue is filled with fat, giving the child a roundness and plumpness which is not observed before term. The hair is fairly abundant and long, and the skin is quite firm, and paler even than at the eighth month.

What is the "vernix caseosa"?

It is a greasy, sebaceous deposit covering the entire foetus, and making its appearance first about the sixth month. It consists of matter secreted by the cutaneous glands mixed with dead epithelium. It is always more abundant in the axillæ and groins, and is said to be of service as a lubricant during labor.

THE FŒTAL HEAD.

Give a description of the foetal head at full term.

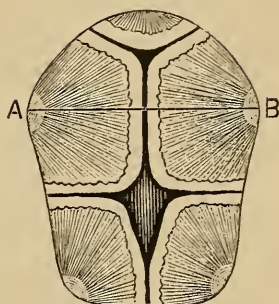
The head at full term is the hardest and largest part of the foetus, is oval or egg-shaped, and is divided into two parts, face and cranium. The face is composed of fourteen bones, two being single and six double.

The cranium, the most important part of the foetus from an obstetrical point of view, is composed of eight bones—a frontal, occipital, ethmoid and sphenoid, two parietal, and two temporal. In the adult these bones are firmly united, while in the foetus they are only so at the base of the skull, being separated at the vertex or vault by membranous intervals, allowing of considerable overlapping during labor (Fig. 9). There are five sutures: (1) the coronal, which separates the frontal from the two parietal bones; (2) the sagittal, or great suture, running from the root of the nose backward to the lambdoid suture: this sep-

arates the two parietal bones and crosses the coronal suture; (3) the lambdoid (Greek lambda, Δ), which separates the occipital from the parietal bones: its apex is at the posterior extremity of the sagittal; (4) and (5) the temporal or squamous sutures, whose names indicate their positions, are unimportant, as they cannot be reached during labor.

Besides the sutures are two fontanelles, an anterior and posterior. The anterior fontanelle, or bregma, is the larger of the two. It is diamond-shaped, formed by the crossing of the coronal and sagittal sutures, and has four borders and four angles. Its boundaries are the frontal bone anteriorly and the two parietals posteriorly. The posterior or smaller fontanelle is formed by the junction of the sagittal and lambdoid sutures. It is triangular in shape, and ossifies rapidly after birth. Its boundaries are anteriorly the two parietal bones, and posteriorly the occipital.

FIG. 9.

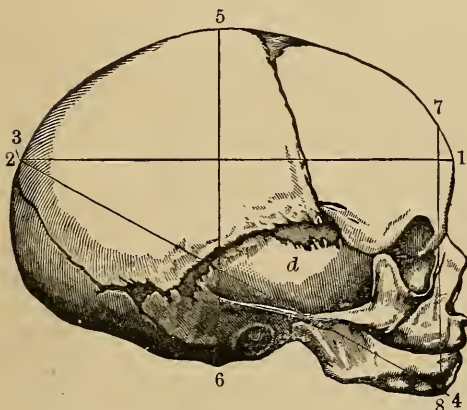


Showing Fontanelles and Sutures at Crown of Head: A, B, biparietal diameter.

What are the diameters of the fœtal skull?

1. The longitudinal diameters are—occipito-mental, 5.4 inches, from the occipital protuberance to the chin; occipito-frontal, 4.6 inches, from the occipital protuberance to the root of nose; suboccipito-bregmatic, 3.8 inches, from midway between the occipital protuberance and foramen magnum to the centre of the anterior fontanelle.

FIG. 10.



1-2, occipito-frontal; 3-4, occipito-mental; 5-6, trachelo-bregmatic; 7-8, fronto-mental.

to the other; the bitemporal, 3.2 inches, from the root of one zygoma to the corresponding point on the opposite side; the bimastoid, 3 inches, from one mastoid process to the other. (These figures are taken from Charpentier, vol. i. pp. 232, 233.)

NUTRITION OF THE FŒTUS.

How does the child receive its nutrition in utero ?

Before the formation of the allantois and umbilical vesicle the ovum derives its nourishment from the cells that form the discus proligerus ; then by the albuminous material covering it. After reaching the uterus the allantois and umbilical vesicle supply it with nourishment until the placenta is formed.

As soon as the placenta is formed the foetal nutrition is fully established, as it acts as an organ of absorption by which nutritious material is carried from the blood of the mother to the foetus. This is proven by the fact that when the placental circulation is interfered with to any great extent the foetus dies.

How is respiration carried on in utero ?

Before the placenta is formed it is possible that there is no respiration, and if there is, the mode in which it is carried on is unknown.

After the formation of the placenta by the contact of its vessels with those of the mother, an interchange of gases takes place, by which the carbonic acid of the foetus is given up and oxygen is absorbed.

What secretions are carried on in the uterus ?

The skin and sebaceous glands secrete the vernix caseosa, the liver secretes bile, the intestines secrete mucus, and the kidneys urine.

Describe the foetal circulation.

To thoroughly understand the foetal circulation the student must bear in mind the fact that the vascular system differs materially from that in the adult in several respects. The chief differences in the heart are the direct communication between the right and left auricle and the large size of the Eustachian valve. The auricles are connected by a small oval opening covered by a fold which acts as a valve, allowing the blood to pass only from the right to the left auricle. This opening is called the "foramen ovale." The Eustachian valve, passing from the inferior vena cava on to the wall of the right auricle, directs the blood through the foramen ovale into the left auricle.

The peculiarities in the arterial system are the communication between the pulmonary artery and descending part of the arch of the aorta by a tube half an inch in length, called the "ductus arteriosus," and the presence of the hypogastric or umbilical arteries, which arise from the internal iliacs, ascend along the sides of the bladder, and, passing out of the abdomen at the umbilicus, are continued along the cord to the placenta.

The venous system has a communication between the placenta and portal vein through the umbilical vein, and with the inferior vena cava by the "ductus venosus." The vessels in the placenta lie in close contact with the maternal vessels, the walls of both here being very thin. Oxygen passes from the arteries of the mother into the veins of the

placenta, and CO_2 is given up by the latter to the former. Thus the oxygenated blood passes along the cord in the umbilical vein through the umbilicus and to the under surface of the liver. Part here is distributed to this organ, and part passes through the ductus venosus to the inferior vena cava. Thus some of the blood enters the inferior vena cava directly by the ductus venosus, but the greater part passes through the liver to enter that vessel by the hepatic veins. It is thus that the liver is unusually large at an early period of foetal life. The blood from the lower extremities also enters the inferior vena cava, and this mixed blood passes into the right auricle, where most of it, guided by the Eustachian valve, is directed through the foramen ovale into the left auricle. From this it enters the left ventricle, and from the left ventricle into the aorta, by which it is distributed mainly to the head and upper extremities, a very small quantity entering the descending aorta. From the head and upper extremities the blood is returned through the superior vena cava to the right auricle: from this it passes into the right ventricle, and from the right ventricle through the pulmonary artery into the ductus arteriosus, and through this into the descending aorta. A small portion of this impure blood goes to the lower extremities, but the greater amount passes into the umbilical arteries to be carried to the placenta.

What changes occur in the foetal circulation at birth?

As soon as the child is born it cries. This inflates the lungs, and consequently dilates the pulmonary arteries. The blood now passes in large quantities from the right ventricle into the pulmonary artery, and thence through the lungs, where it becomes arterialized, and is returned by the pulmonary veins to the left auricle. The ductus arteriosus, as soon as the child respire, contracts, and becomes completely closed in from four to ten days, remaining as a fibrous cord. On account of an adhesion of the valve of the foramen ovale this opening closes. By the tenth day after birth it is usually closed, though in some cases it remains pervious, giving rise to a cyanotic condition of the child. The umbilical arteries between the fundus of the bladder and the umbilicalis become obliterated, and remain as fibrous cords. The vein and ductus venosus are completely obliterated a few days after birth, the former becoming one of the ligaments of the liver.

What is the attitude of the full-term child in utero?

The body is arched forward, head flexed upon the chest, arms pressed tightly against the sides of the chest, with the forearms flexed and crossed in front. The thighs are flexed on the pelvis and the legs on the thighs. The feet are turned in, inverted, and crossed. In the vast majority of cases the upper extremity, or head, lies in the lower segment of the uterus, while the lower extremity, or breech, lies in the fundus. Motility or motion of the foetus begins as early as the tenth or twelfth week, but the mother is not conscious of the early movements.

PHENOMENA OF PREGNANCY.

What changes occur during gestation in the pelvis?

No changes occur in the bones of the pelvis, but marked alterations in the articulations take place as gestation advances. The interarticular fibro-cartilages imbibe a serous fluid, which softens and relaxes them, so that they allow of some slight separation during the passage of the foetus through the pelvis. This is more marked in the pubic joints.

What changes occur during gestation in the vulva?

As the end of pregnancy approaches the labia majora become oedematous and pigmented, and may contain varices. The nymphæ become moist, more freely lubricated, and hyperæmic. The whole mucous membrane of the vulva acquires a dark-red color.

What changes occur during gestation in the vagina?

It is growing larger for the passage of the head. It begins to lengthen between the third and fourth month on account of the rising of the uterus, but becomes shorter when the organ descends and the foetus "engages." It acquires a violet color and its secretions increase. A purely vaginal leucorrhœa may occur during the first few months of pregnancy. This is perfectly physiological.

What changes occur during gestation in the uterus?

1. *Changes in Volume.*—As soon as the ovum reaches the uterus that organ begins to grow. During the first half of pregnancy it is in active growth, but later it becomes more a distension, due to the pressure of the developing foetus. According to Cazeaux, the uterus at the ninth month of pregnancy measures 13.6 inches in its vertical diameter, 9.36 inches in its transverse, and 8.9 inches in its antero-posterior diameter, and weighs nearly 30 ounces. The increase in volume is always at the expense of the fundus and body, as the cervix is not affected at all.

2. *Changes in Form.*—The form varies with the presentation, position, and the number of children. If a vertex or breech, it changes from a triangular shape to that of a flattened spheroid from the fifth to the sixth month, and from the sixth to the ninth month it becomes ovoidal or egg-shaped, with the smaller end down. The position of the fundus at the different months varies somewhat, but averages about as given below: At the third month the fundus can just be appreciated above the pubes; at the fourth month the fundus is about $2\frac{1}{2}$ finger-breadths above the symphysis; at the fifth month the fundus is slightly more than midway between the symphysis and umbilicus; at the sixth month the fundus is even with the umbilicus; at the seventh month it is nearly 3 finger-breadths above the umbilicus; at the eighth month it is nearly to the ensiform appendix; about the middle of the ninth month it has reached the ensiform appendix, and a week or ten days

before labor begins it sinks somewhat into the pelvic cavity. This is called "the falling of the uterus."

3. *Changes in Consistency.*—Instead of being hard and fibrous, as in virgins, it gradually becomes soft and elastic, so that it moulds itself about the foetus, and through its walls can readily be felt the different portions of the child.

4. *Changes in Direction.*—The uterus changes its direction continually according to the position taken by the woman, until it has risen well out of the pelvis, when its tendency is to lie forward on the abdominal wall. This is in reality an anteversion. There is also a so-called "lateral obliquity" of the uterus. The cause of this is unknown, but in most cases it bends to the right side.

5. *Changes in its Relations to the Surrounding Organs.*—While in the virgin the uterus lies between and in relation with the bladder (anteriorly) and rectum (posteriorly), at full term nearly the entire organ lies against the anterior abdominal wall, only a very small portion touching the posterior surface of the bladder. Posteriorly it is in relation with the rectum and the iliac vessels.

6. *Changes in Structure.*—We find in the peritoneal coat a simple hypertrophy and a distension as the uterus increases in size. This coat does not become thinned out. In the muscular layer marked alterations take place. The previously small fibres become greatly increased in size in all directions, but especially so in length. There is also a development of new unstriped muscular fibres and of connective tissue.*

7. *The Power of Contraction.*—Painless, intermittent contractions constantly occur after the third month. They aid in keeping the foetus in position and help to keep the blood in circulation.

8. *Changes in the Uterine Vessels.*—As the organ increases in size the arteries and veins grow very large; at the same time new vessels are formed.

9. The changes in the mucous membrane and formation of the decidua were given on page 27.

What changes occur during gestation in the cervix?

The first change which occurs in the cervix is a softening, beginning at the os externum and gradually passing upward, until by the eighth month the entire cervix is soft and ready to dilate, allowing the presenting part of the child to descend and rest upon the external os. Toward the end of pregnancy the os externum usually, though not always, becomes patulous, and will admit the tip of the examining finger. In multiparæ (women who have borne children) this is always the case; while the cervix is invariably more or less torn during the birth of the first child, previous to which event such patulency is rare.

* For a more complete description of the muscular fibres of the uterus during gestation the student is referred to the *Cyclopædia of Obstetrics and Gynecology*, by Charpentier, vol. i. p. 136.

What changes occur during gestation in the ovaries, tubes, and ligaments?

The ovaries and tubes rise in the abdominal cavity and become hypertrophied. Ovulation ceases. The broad and round ligaments increase in size and rise with the growth of the uterus.

What changes occur during gestation in the mammary glands?

Soon after impregnation has occurred the breasts begin to enlarge and the veins become more prominent. The areola in brunettes assumes a dark-brown color, in blonds only moderately so, and a few small tubercles appear in the areola. These are called the "tubercles of Montgomery." Around the primary or true areola small dark spots are seen which constitute the so-called secondary areola. Toward the end of pregnancy a few drops of a serous fluid can be squeezed from the nipple: this is the colostrum.

What changes occur during gestation in the cutaneous system?

Here we find pigmentation occurring in blotches over different parts of the body, and frequently on the face. These usually, but not always, disappear. The labia majora become very dark in most cases, and running up the abdomen in the median line from the pubes to the umbilicus is a brown line. As a rule, the pigment is deposited around the umbilicus, and then the line extends on up the abdomen to the ensiform appendix. In the iliac regions reddish-purple striæ are seen. These are ecchymoses caused by tearing apart the small muscular fibres from the rapid distension of the abdominal wall. After labor they acquire a white color, and always remain in the abdominal wall as cicatricial or scar tissue.

What changes occur during gestation in the blood?

There is an increase in the quantity of water and fibrin, and a decrease in the amount of albumin, iron, and excrementitious substances. There is also a decrease in the number of red corpuscles. These changes are more marked after the sixth month. The heart becomes hypertrophied, because there is more force needed. The hypertrophy is entirely in the left ventricle. Its weight is increased from one-fifth to one-fourth. After childbirth the heart undergoes a retrograde action and regains its normal size. There is an increased tension in the arteries and an enlargement of the superficial blood-vessels, especially of the thighs.

What changes occur during gestation in the respiratory apparatus?

During pregnancy the chest becomes broader, the antero-posterior and vertical diameters are diminished, and there is a tendency to dyspnoea on the slightest exertion.

What changes occur during gestation in the digestive apparatus?

The digestive organs are always crowded out of their normal position. Pressure on the rectum causes constipation, and hemorrhoids may result. The crowding upward of the stomach may cause vomiting.

What changes occur during gestation in the urinary organs?

There are compression and displacement of the bladder, causing an irritability, so that after the sixth or seventh month a pregnant woman is only able to retain her urine for a very short time. A cystitis may also be set up. The urethra is usually displaced, and the kidneys are pressed upon, sometimes enough to cause a congestion which at times results in an albuminuria. The urine also shows marked changes, there being an increase in the water, the chlorides, and carbonates, and a decrease in the phosphates, sulphates, urea, and uric acid. "Kiestein" is almost always found in the urine of a pregnant woman. This is a deposit seen when the urine has stood for some time, and it is not always a sure sign of pregnancy, as has been supposed.

What changes occur during gestation in the osseous system?

Changes have been noted. These consist in deposits of bone between the internal table of the cranial bones and the dura mater. These deposits are called osteophytes.

What changes occur during gestation in the nervous system?

Some changes almost invariably occur. Neuralgic pains over different parts of the body, toothache, and perverted sense of taste or smell are frequently observed.

SIGNS, SYMPTOMS, AND DIAGNOSIS OF PREGNANCY.**Name the symptoms of pregnancy as nearly as possible in the order in which they occur, including a few points in diagnosis.**

1st. *Suppression of the Menses.*—If a woman in perfect health, who has been menstruating regularly, suddenly ceases to do so, with no disturbances from it, she is in all probability pregnant. There are many causes for amenorrhœa, but as a rule disagreeable symptoms accompany this malady. On the other hand, women occasionally menstruate regularly for several months after impregnation has taken place, and cases have been reported where this function was carried on throughout gestation. Then, again, pregnancy has occurred when the function was absent, as during lactation.

2d. *Sympathetic Nervous Disturbances.*—Some sympathetic disturbances constantly occur in most pregnant women. These are apt to be more marked in highly neurotic patients or those of a nervous temperament. Among them are found itching, tingling, or "peculiar sensa-

tions" in the breasts, and neuralgic pains over various parts of the body, most frequently in the face. There may be toothache, with no destructive changes in the teeth, and often the woman who naturally is of a very amiable disposition becomes sensitive, morose, irritable, or despondent. Occasionally a marked tendency to frequent attacks of syncope is developed, but most marked of all are the digestive disturbances. There may be a capricious appetite, with longings for the most peculiar articles as food, such as slate-pencils, plaster, chalk, charcoal, etc.

But of greater frequency are the nausea and vomiting. This occurs usually on rising in the morning; hence it has been called "morning sickness." It may be seen soon after impregnation has occurred, but as a rule not until the middle or end of the second month. The cause of this morning sickness has been disputed, but the generally received opinion now is that it is purely a reflex disturbance, due to the irritation of the uterine nerves by the pressure of the growing muscular fibres upon them.

3d. *Glandular Changes*.—Those occurring in the breast and kidney have already been described (pp. 38 and 39). There is one more which deserves mention: this is the activity of the salivary glands. Occasionally very severe and annoying ptyalism is seen. This usually ceases spontaneously early in pregnancy.

4th. Other digestive disturbances, as flatulency, heartburn, constipation, or sometimes diarrhœa, may occur.

5th. *Reflex Pigmentary Changes*.—These have already been described (on p. 38). They are very constant in brunettes, less marked in blonds, and may be entirely absent in women with red hair.

6th. A violet color of the vaginal mucous membrane is seen frequently. This is a capillary congestion caused by the pressure of the gravid uterus, and is of very little value, as any pelvic tumor may cause the same condition.

7th. A marked irritability of the bladder may be found. At times this becomes very annoying, and increases as pregnancy advances.

8th. *Changes in the Umbilicus*.—At first the umbilicus is somewhat depressed. It then becomes even with the abdominal wall, later bulges slightly, and during the latter months may be drawn upward.

9th. Abdominal enlargement is first noticed about the fourth month, when the uterus has risen well out of the pelvis. From this time on it increases rapidly, until the ninth month, when it has reached the diaphragm. This is much more marked in short women.

10th. *Intermittent Uterine Contractions*.—This is a constant symptom after the uterus is large enough to be felt, and when found by a competent observer is a very valuable sign. It consists in regular intermittent contractions of the uterus, occurring every five, ten, or fifteen minutes. They are painless, and therefore not appreciated by the mother.

11th. "*Quickening*."—This is a sensation felt by the mother when the uterus has reached a sufficient height in the abdominal cavity, so that the movements of the foetus may be felt against the abdominal wall. It usually occurs first about the eighteenth or nineteenth week, and is described as a slight fluttering. The movements become stronger and more frequent as pregnancy advances, and may often be seen as a quick bulging of the abdominal wall. This is not a very valuable sign, as women who think themselves pregnant often imagine that they feel the foetal movements. A similar sensation to "quickening" may be caused by spasmodic contractions of the abdominal muscles or flatus in the intestines.

12th. *Changes in the Cervix*.—As early as the third month it may be noticed that the cervix is more easily felt on vaginal examination. It soon becomes softer, and in primiparæ somewhat different in shape and longer than in multiparæ. In the latter it has more of an oval shape, slightly flattened antero-posteriorly, while in the former it is long and conical. The os externum until the latter months of pregnancy, and sometimes until labor begins, is tightly closed in primiparæ, while in multiparæ, on the contrary, it will usually admit the tip of the finger by the third or fourth month.

13th. *Ballottement*.—This is the sensation which is felt when, with two fingers in the anterior cul-de-sac of the vagina, the foetus is suddenly pushed away, floats in the liquor amnii, and falls back again, striking the fingers. It is an exceedingly valuable sign of pregnancy *when found*, as no other condition will give it. However, it requires considerable experience for one to be positive about this sign. It can usually be appreciated between the fourth and seventh months. After this the foetus has become so large and fits so tightly in the lower segment of the uterus that it is impossible to get ballottement. In order to make ballottement easy the woman should lie with her shoulders well elevated, or, better still, sit or stand. There is also a so-called abdominal ballottement. This is appreciated by placing one hand on each side of the abdominal wall, and pushing the foetus with a quick movement of one of the hands. It is felt to strike the other.

In breech cases a form called "cephalic ballottement" is obtained. This is gotten by placing one hand over the head and pushing it away. It rebounds and strikes the hand, giving an impulse as in the other forms.

14th. *Auscultation*.—This is always to be practised with the woman lying on her back: the stethoscope should be used, and applied directly to the abdominal wall. Over the abdomen of a pregnant woman we may hear three sounds. These are the foetal heart, the uterine souffle, and the funic souffle.

(1) *The Foetal Heart*.—This is the one positive sign of pregnancy, and can usually be heard by the beginning of the fifth month, though occasionally earlier. It is very variable both in rapidity and strength. The frequency ranges from 110 or 120 to 160 or 170, and the strength

varies according to the sex and size of the child. In males and large children it is slower and stronger; in small children and females it is more rapid and weaker. As a rule, male children are somewhat larger and heavier, hence the foetal heart-sound is slower and stronger. It may sometimes be heard over the entire abdomen, though there is always a point or area of maximum intensity. This will be further considered when the subjects of presentation and position are taken up.

(2) *The Uterine Souffle*.—This is a peculiar soft blowing or harsh whizzing sound, synchronous with the maternal pulse and heard at some point over the abdominal wall. It was formerly supposed to be a sound caused by the passage of blood through the placenta, and hence has been also called the “placental bruit.” It may be heard after the fifth month, and varies considerably in intensity and position, sometimes being absent, then suddenly appearing over one point of the abdomen, to be heard a few minutes later at a point very remote from this. It is probably caused in some unexplained way by the blood passing through the tortuous uterine arteries. That it is not placental in origin is conclusively proven by the fact that it is heard after the placenta has been expressed, and in cases of uterine enlargement from tumors where the condition of pregnancy is absent. Thus it is apparent that this sign is of little value in diagnosing pregnancy.

(3) *The Funic Souffle*.—The funic or umbilical souffle is a soft blowing murmur, synchronous with the foetal heart-sounds, and when heard may be situated at any point over the abdomen. It is very rarely found, but when so is probably created by a tension of the cord or pressure of the same against the uterine wall by some bony prominence of the child. The tension would be most frequently caused by a cord wound around the neck or perhaps a knotted cord.

15th. *Palpation*.—By abdominal palpation we appreciate different parts of the child and recognize the position and presentation. It is of little value before the sixth month. On this subject more will be said later.

Many of the preceding signs and symptoms of pregnancy occur at or about the same time, so that it is almost impossible to give them in exactly the order in which they occur. However, an attempt has been made to describe them as nearly as possible in order of their appearance. It might be mentioned here that many authors classify them according to the month they occur or their relative importance. Others divide them into subjective and objective symptoms.

What are the four most important symptoms or signs?

- The foetal heart ;
- Ballotement ;
- Milk or colostrum in the breasts of pregnancy ;
- Suppression of the menses.

How would you differentiate between the first and subsequent pregnancies?

Primiparæ.

Nipple usually small and undeveloped.

Not likely to be any striæ on the breasts.

Abdomen tense and resisting to touch.

Striæ, if present, are of a purplish-red color.

The vagina has a markedly corrugated feel.

The cervix is longer and conical.

Perineum is tense and long.

Fourchette is present.

Multiparæ.

Nipples large, and apt to be well developed.

Striæ frequently found on the breasts.

Abdomen usually very lax and yielding.

Striæ white, though there may also be some reddish ones.

The vagina feels smooth.

Cervix short, and very likely somewhat lacerated.

Perineum may be torn.

No fourchette.

What methods of examination should be pursued in making the diagnosis of pregnancy?

First, the woman should be questioned concerning the date of her last menstruation and its character and regularity previous to stoppage. The physician should question her as to any digestive disturbances, such as nausea, vomiting, etc., from which she may have been suffering; then as to whether or not she has had any peculiar sensations in her breasts.

Secondly, the breasts and abdomen are to be inspected. This is best done with the patient in a recumbent position, as afterward a vaginal examination must be made, and this is much better done in the dorsal decubitus. The shape of the breast is observed, the areola, the superficial veins, and the tubercles of Montgomery; also the size of the abdomen, its shape and pigmentation. Percussion is then performed, and afterward palpation and auscultation.

Thirdly, a vaginal examination is made. The secretions are noted, the cervix and os felt, and the finger is swept in all directions to determine roughly the size of the pelvis.

DURATION OF PREGNANCY.

What is the average duration of pregnancy? and how is it computed?

The average duration is 278 days. This is a little more than nine calendar and a trifle less than ten lunar months. As insemination is not necessarily conception, it is impossible to determine accurately the exact day when labor should occur. Conception may take place as long as ten days after insemination. For all practical purposes 280 days is counted from the first day of the last menstruation. One rule in common use is

to add three days to the last day of the last menstruation, and subtract three calendar months from a year from that date. If February is included, add five instead of three days. Cases have been reported where the pregnancy has continued 290, 300, and even 313 days.

DIFFERENTIAL DIAGNOSIS OF PREGNANCY.

What conditions resemble or may be taken for pregnancy?

(1) Spurious pregnancy; (2) obesity; (3) ascites; (4) tympanites; (5) subinvolution of uterus; (6) ovarian tumors; (7) fibroid tumors; (8) retained menses.

What is spurious pregnancy, and how differentiated from true?

This usually occurs about the fortieth year of life or at the menopause, but may be met with at any time during the child-bearing period. It is usually associated with ovarian irritation, and is met with most frequently among the upper classes. It may begin by some irregularity in the menstrual flow. Then the abdomen enlarges, either from a crowding down of the abdominal wall from a deposit of fat or from distended intestines. The muscles become very rigid, and, what makes the diagnosis more difficult, oftentimes a condition of hyperæsthesia is found. The patient complains of a loss of appetite and of morning nausea. Peculiar feelings in the breasts may be described, and occasionally these glands become enlarged. This condition may go on until a spurious labor begins, unless a diagnosis be made and the patient be assured she is not pregnant. If care is taken a diagnosis of the condition is easily made. On being questioned it will probably be found that menstruation has been going on, though perhaps altered in character and at infrequent intervals. No foetal movements can be felt, nor can a foetal heart be heard. On vaginal examination the cervix is found long and hard and the uterus not enlarged. If doubt still exists, by giving an anaesthetic the tumor will disappear.

How may pregnancy be differentiated from obesity?

In some women this condition is associated with irregularities in the menstrual flow which lead them to imagine they are pregnant. The condition may be so marked that even though pregnancy does exist the uterus cannot be felt on palpation. The absence of all signs and symptoms of pregnancy, especially of the mammary changes and auscultatory signs, makes the diagnosis easy.

How may pregnancy be differentiated from ascites?

By making a careful physical examination of the patient the condition causing the ascites can usually be discovered. Furthermore, if the patient be placed upon her back, it will be noticed that the abdomen bulges more at one point than at another, and marked fluctuation can usually be obtained.

How may pregnancy be differentiated from tympanites and subinvolution of the uterus?

This condition is easily recognized by percussing the abdomen.

Subinvolution of the uterus can be mistaken for pregnancy only at a very early period, when a positive diagnosis is, under any circumstances, impossible. However, it is almost always associated with symptoms referable to uterine troubles, such as pain in the sides or back, a leucorrhœal discharge, and tenderness on pressure over the uterus. By waiting and finding no increase in the size of the organ the diagnosis is assured.

How may pregnancy be differentiated from ovarian and fibroid tumors?

When either of these conditions exist alone, by a careful examination the diagnosis is not difficult; but when pregnancy is complicated by one or the other, it is sometimes extremely difficult, and occasionally impossible, to arrive at a positive conclusion. With the former we usually have a continuance of menstruation, may get fluctuation, and with the absence of cervical changes and auscultatory phenomena the diagnosis is made. In the latter the peculiar hard and round feeling of the mass, a profuse menstruation, and absence of fœtal heart-sounds will materially aid in making a diagnosis. In both cases the history is of great importance.

How may pregnancy be differentiated from retained menstrual fluid?

This is most likely to occur in girls who have never menstruated, and when found in such cases the condition would be immediately suspected, and an examination would reveal the presence of an imperforate hymen or some other obstruction to the outlet for the flow. Or, if it occur later, the fact that no mammary changes were found, the cervix normal, auscultation negative, and ballottement absent would prove the non-existence of pregnancy. In both cases a history would probably be of importance, and this would elicit the fact that the patient had suffered from excessive abdominal pains during the time when the menstrual flow should have occurred.

DEATH OF FŒTUS IN UTERO.**What symptoms would indicate the probable death of the fœtus in utero, and how would you diagnose this condition?**

The mother begins to suffer from ill health. She becomes despondent with no apparent cause, and loses strength and appetite. Her abdomen, which has been gradually enlarging, suddenly ceases to increase in size, and the breasts, which were firm, become flabby and atrophied, and the movements of the fœtus, which have previously been felt, suddenly or

perhaps gradually cease. The diagnosis is made positive if with the symptoms recorded above we find no fetal heart-sounds for several successive days, when previously they have been heard.

HYGIENE OF PREGNANCY.

What hygienic rules should be observed during pregnancy?

The pregnant woman must be especially particular about her clothing. Her garments should be loose-fitting and warm. Corsets are to be absolutely forbidden, as they compress the breasts and by pressure on the walls of the chest cause an abdominal type of respiration, which displaces the stomach, liver, and intestines, and gives rise to much discomfort, and frequently to serious results. She must have plenty of fresh air and take moderate exercise, excluding all violent forms, such as horseback riding, rapid walking, running up stairs, etc. She should avoid excitement. Her diet must be wholesome and nutritious, and the bowels, which are almost invariably constipated, should be kept open by mild laxatives, enemas, or mineral waters. Intercourse ought to be only moderately indulged in, if at all, during the early months and prohibited during the latter months. If patients have been in the habit of douching themselves regularly and intelligently, this practice may be continued. Baths may be taken throughout, but should never be too hot, or, on the other hand, too cold.

DISORDERS OF PREGNANCY.

How may the disorders of pregnancy be divided?

(1) Into those due to mechanical causes (hemorrhoids, dyspnoea, varicose veins, etc.).

(2) Into those of reflex origin or sympathetic disturbances (nausea, vomiting, etc.).

(3) Into those due to pathological conditions of the uterus or ovaries (retroversion and moles).

(4) Into certain diseases which are engrafted upon pregnancy: among these anemia and albuminuria are found.

Describe the disorders of digestion.

The most important are nausea and vomiting. These disorders usually require no treatment, as they generally disappear by the third or fourth month. However, some cases continue, and are of such a severe type that they must be treated. The causes are reflex in origin, and are (1) pressure on the uterine nerves from stretching of the muscular fibres of the uterus; (2) irritation of the uterine nerves from a flexion of the uterus; (3) erosion on the cervix; (4) emotion.

Symptoms.—In the severe cases the vomiting occurs not only in the morning, but whenever food is taken, and even when the stomach is

empty a violent retching continues, so that the patient in a short time becomes exhausted and emaciated. The pulse is rapid and feeble, the temperature elevated, the tongue dry and coated, and delirium, followed by death, may occur.

These grave cases are said to be more often associated with multiple gestations.

Treatment.—In the milder cases, where the vomiting occurs in the morning, relief may often be obtained by giving the patient a half hour before rising a glass of hot milk: this while in a recumbent position. A great many remedies have been used, but all are very uncertain. Among them may be mentioned oxalate of cerium in gr. ij to gr. xx doses; dilute hydrocyanic acid in $\mathfrak{m}\mathfrak{j}$ doses; tincture of iodine in $\mathfrak{m}\mathfrak{i}\mathfrak{j}$ doses; wine of ipecac in milk ($\mathfrak{m}\mathfrak{x}$ – $\mathfrak{m}\mathfrak{xx}$); the bromides in effervescence; small doses of calomel (gr. $\frac{1}{6}$ – $\frac{1}{2}$), frequently repeated; pepsin; chloral hydrate in gr. j doses; and hydrochlorate of cocaine in $\frac{1}{8}$ – $\frac{1}{4}$ gr. doses; iced champagne; and externally both heat and cold applied over the epigastrium. Dilating the cervix has been done with good results in some cases. In the most severe cases the stomach must be given complete rest and rectal alimentation resorted to. A good nutrient enema may be made up of—

Peptonized milk,	$\mathfrak{Z}\mathfrak{v}$;
Liquid peptonoids,	$\mathfrak{Z}\mathfrak{j}$;
Tr. opii,	$\mathfrak{m}\mathfrak{x}$;
Salt,	q. s.

Or,	Beef tea (peptonized),	$\mathfrak{Z}\mathfrak{i}\mathfrak{v}$;
	Brandy,	$\mathfrak{Z}\mathfrak{ss}$;
	Laudanum,	$\mathfrak{m}\mathfrak{x}$ – $\mathfrak{xx}$.

Sig. Either given every four hours, washing out the rectum before each enema.

If after a trial none of these prove successful, and the patient's condition is steadily growing worse, as a last resort induce abortion. Dilate the cervix first and wait a day, as this may check the vomiting. If not, rupture the membrane. The methods will be described farther on. Always call a consultation before an operation of this kind.

The other digestive disturbances are constipation and diarrhœa. The former is by far the more frequent, though the latter is not nearly as rare as is generally supposed. Constipation is caused mainly by impaired peristaltic movements of the intestines, which is brought about by pressure from the gravid uterus. This must be relieved by proper diet, mild laxatives, and enemata.

Where diarrhœa occurs it should be promptly treated, for when excessive it has a decided tendency to produce uterine contraction and abortion.

What are the disorders resulting from mechanical interference of the gravid uterus? Describe them.

(1) *Dyspnœa*.—This is usually present to a slight degree, but may be so excessive as to prevent the patient's sleeping when in the recumbent position.

(2) *Varicose Veins*.—The most frequent seat of these is on the inner sides of the thighs and the labia majora. They occur most frequently in multiparæ, and are caused by pressure of the gravid uterus on the abdominal veins, and thus an impeded return flow of the blood from the extremities. As a rule, they give no trouble, though cases occasionally arise where they become inflamed and extremely painful. The *treatment* consists of rest in the recumbent position, elevation of the limbs, and the application of some evaporating lotion.

(3) *Hemorrhoids*.—Hemorrhoids, though aggravated and occasionally caused by constipation accompanying pregnancy, are frequently seen where this condition is not associated with gestation. In these cases the cause is simply pressure of the gravid uterus on the hemorrhoidal veins. If constipation exists, it is to be treated, and if the hemorrhoids become very troublesome, the application of an ointment containing gallic acid and opium will afford much relief.

(4) *Œdema of the Lower Extremities*.—This is of no consequence if not associated with albuminuria, and requires no treatment. It always disappears after labor. If very excessive, rest relieves it.

(5) *Irritability of the Bladder*.—As a rule, this does not occur until toward the end of pregnancy, but may be met with at the outset. It may be caused by some abnormal presentation of the foetus, and is relieved immediately the position is rectified. If not, and if very excessive, vaginal suppositories containing opium and belladonna will often give relief.

Describe briefly the disorders affecting the circulatory system.

Anæmia.—This is due to the alterations in the blood which have already been described. It is a physiological accompaniment of pregnancy, and as a rule never becomes severe. However, it may at times go on to an alarming extent. In these cases the onset is usually insidious. The face becomes colorless and slightly puffy; œdema of the lower extremities begins, and may become general or even invade the serous cavities. The patient grows weak and emaciated, and suffers from sleeplessness, dyspnœa, headache, vertigo, and frequent attacks of syncope. On examining the heart a systolic murmur is heard, usually over the base, though sometimes over the apex. This is transmitted into the larger vessels of the neck.

The *treatment* consists in regulating the diet and placing the patient under the most favorable hygienic surroundings. Iron may be given combined with arsenic. The best preparation is iron reduced by hydrogen in gr. j to iij doses, *t. i. d.* A very efficient and palatable prepara-

tion is the so-called iron lemonade. This is made in the following manner: A teaspoonful of each of the following mixtures, combined with four ounces of water and a half ounce of lemon-juice, taken three or four times daily:

Citrate of iron,	$\frac{3}{4}$ ij;
Water,	$\frac{3}{4}$ iv.—M.

Or,	Bicarbonate of potash,	$\frac{3}{4}$ x;
	Water,	$\frac{3}{4}$ iv.—M.

If the anæmia persists after proper and thorough treatment, abortion or premature labor must be induced.

Diseases of the Heart.—It is only necessary to mention the fact that pregnancy has a decided tendency to aggravate, and perhaps hasten the fatal termination in, chronic heart lesions. This is especially marked in cases of mitral disease.

Ascites.—A cellular infiltration of the tissues of the extremities or other parts of the body is sometimes found during pregnancy from the altered condition of the blood. This may extend to the pleural or peritoneal cavities. It is treated by removing as far as possible the cause, and the use of diuretics, combined with rest and a milk diet.

What disorders depending upon an altered innervation are met with in pregnancy?

Ptyalism, palpitation, syncope, insomnia, mania, neuralgia, cephalalgia, paralyses, cough, pruritus, and eclampsia.

Describe each.

Ptyalism, or salivation, is an increased activity of the salivary glands, and thus a profuse flow of saliva. It is, as a rule, confined to the early months of pregnancy if it occurs at all, and has a tendency to disappear spontaneously. It sometimes becomes exceedingly annoying, and causes depression, and perhaps interferes with proper assimilation of the food.

Its *treatment* is very unsatisfactory. Astringent gargles and washes for the mouth, the chewing of quassia-chips and bitter orange-peel, and the administration of atropine, in gr. $\frac{1}{100}$ doses, are among the remedies used to relieve it.

Palpitation and *Syncope* call for no especial treatment, more than a proper hygienic regime.

Insomnia may be very troublesome, and from its persistence cause exhaustion, depression, and even insanity. Moderate exercise, early retiring, and the avoidance of all excitement may be sufficient to relieve it. If not, the bromides in moderate doses, sulphonal, chloral, or aniline hydrate will usually produce a natural and healthy sleep. Opium in any form is contraindicated.

Neuralgia and *Headache* are to be treated as when met with under other circumstances.

All forms of *Paralysis* may be met with in pregnant women or after delivery has taken place. They always have a marked tendency toward hemiplegia or paraplegia, though some one organ of special sense may be involved, or the paralysis may be confined to the limbs, face, or some of the muscles. Those occurring during pregnancy may be reflex or may have a uræmic origin. Others are due to cerebral congestion, and there are unquestionable cases of a purely functional character.

The *prognosis* depends upon the cause, but as a rule is good.

The *treatment* depends entirely upon the cause. Rest, tonics, strychnine, massage, and electricity have all been employed.

Coughs are purely reflex, and for them antispasmodics are of benefit. Codeine in gr. $\frac{1}{4}$ doses is good.

Pruritus.—This is most frequently found about the vulva, but may extend over the entire body and be almost unbearable. If this is the case, it is usually found without any apparent cause and is of neurotic origin. This also may be the case where observed about the vulva, but generally an aggravating cause will be found in the leucorrhœal discharge which is so often met with in pregnant women.

The *treatment* of leucorrhœa, if present, consists in thorough cleanliness. If erosions are found on the cervix, they must be treated by touching with a solution of nitrate of silver. Vaginal douches once or twice daily of carbolio-acid solutions, 1 : 80 or 1 : 100, a solution of borax, $\bar{3}$ ss to Oj, or of bichloride of mercury, 1 : 5000, will generally relieve the leucorrhœa. External applications are often of benefit when the pruritus is severe. A solution of AgNO_3 , gr. xx- $\bar{3}$ j, painted over the vulva, oftentimes relieves the itching immediately. Cloths wrung out of carbolio acid, 1 : 100, are sometimes efficient. At night the patient may apply to the vulva a pad wrung out of a solution containing the following :

R. Borax,	$\bar{3}$ ij ;
Morph. sulph.,	gr. viij ;
Rose-water,	$\bar{3}$ vj ;
Dilute hydrochloric acid,	$\bar{3}$ j.—M.

When the pruritus becomes general the patient should be thoroughly sponged with a solution of bicarbonate of soda and water and put upon her back in bed. The diet must be carefully regulated, and large doses of the bromides are said to have been used with decided success.

Chorea.—This is a very serious, though fortunately not a frequent, complication of pregnancy. It is usually found in primiparæ and very young patients, and in many cases inquiry will reveal the fact that the patients have previously suffered from the disease. It generally develops during the early months, though it may occur any time.

The *symptoms* may appear suddenly or come on slowly. If the latter be the case, there is first noticed slight involuntary movements of the face or limbs, which gradually become more marked. When the attack

is sudden a number of parts are simultaneously involved. There are apt to be exacerbations and remissions of the disease. During sleep the movements cease, to reappear again when the patient awakens in the morning. There may be a weakening of the memory, though as a rule this is not impaired. There is no fever and no digestive disturbances.

Treatment.—When the disease develops early, there is little chance of the pregnancy going on to term, though the treatment is practically the same as when the disease is found under ordinary circumstances. It consists in placing the patient under proper hygienic surroundings and giving her a nutritious diet. Tonics should be given, combined with bromides, arsenic, and iron. If the paroxysms still go on increasing in severity, abortion or premature labor must be induced.

Eclampsia will be described later on.

DISPLACEMENTS OF THE UTERUS.

What displacements of the gravid uterus are met with during pregnancy which may cause grave symptoms?

Prolapse, either Complete or Incomplete.—This is a very rare, though an occasional, occurrence.

The *causes* are the pre-existence of prolapse, multiparous state, traumatism, justo-major pelvis, and large vulva. In many cases, as the pregnancy advances, the prolapse cures itself during the first few months; in others it is the means of causing abortion.

The *treatment* consists in replacing the uterus, introducing a proper pessary, and enjoining absolute rest in the horizontal position.

Anteversion.—Uterine anteversion is merely an exaggeration of a normal state, and becomes really pathological only when it exceeds a certain limit or when it occurs in the true pelvis—*i. e.* in the first months of pregnancy (Charpentier). As pregnancy advances when the condition exists abnormally it produces a pendulous abdomen. The anteversion may reach any degree, from forming simply a very acute angle with the pelvic axis to reaching the symphysis and forming nearly a right angle. It is most frequently found in multiparæ.

The *symptoms* produced are marked bladder irritability, pains in the back and loins, and excessive constipation.

The *treatment* is mechanical, and consists in keeping the patient at rest, and, if the abdomen is pendulous, applying some form of abdominal bandage which will properly support it.

Retroversion.—This is by far the most serious of the uterine displacements. It rarely occurs before the third or after the fifth month, and is most frequent between the third and fourth months. Two forms are described: (1) A gradual retroversion, the causes of which are the occurrence of pregnancy in a previously retroverted or retroflexed uterus, justo-major pelvis, deformed pelvis, fibroid and ovarian tumors, and adhesions from an old peritonitis. (2) Sudden retroversion may be caused

by blows, falls, and pressure upon the abdomen, but usually has as a predisposing cause some of the conditions stated above.

Symptoms.—The first symptoms noticed are marked intestinal and vesical disturbances, the bladder at times becoming enormously distended. The patient complains of pain in her back and limbs and a sense of weight or bearing-down within the pelvis. On examination, if the labia are separated, the posterior vaginal wall is found bulging forward. The cervix is felt up by the pubes or cannot be reached at all. From the excessive distension of the bladder a constant dribbling of urine may occur, and if the catheter is passed—which is always very difficult and may be impossible—a large quantity of strong-smelling urine is withdrawn. Three results may now follow: 1st. The uterus may straighten itself spontaneously and rise out of the pelvis—a fortunate but rare occurrence. 2d. The uterus becomes incarcerated within the pelvis, congestion and inflammation follow, with fever, prostration, vomiting, irregular and feeble pulse, exhaustion, and death; or from the extreme distension of the bladder this organ ruptures, causing a fatal peritonitis. In some cases the urinary elements are retained, and death from uræmia follows. 3d. The woman may abort.

The *diagnosis* is made by feeling no fundus on abdominal palpation, and when a digital examination is made the finding of a hard round mass pushing forward the posterior vaginal wall. Then if the cervix can be felt at all, it will be back of the pubes.

Treatment.—As soon as the condition is discovered the uterus should be replaced. Finding this impossible, the only resource is to induce abortion. To replace the retroverted uterus the patient should be placed in the knee-chest position and pressure made on the fundus in an upward direction. Failing in this, anaesthetize the patient, and with two fingers in the rectum push the fundus upward. This is facilitated by drawing the cervix downward by means of the finger and thumb of the other hand introduced into the vagina, or, if this cannot be done, by the use of the tenaculum.

ALBUMINURIA.

What forms of albuminuria are met with?

(1) Albuminuria in pregnant women with pre-existing renal lesions;
(2) Idiopathic albuminuria; (3) Albuminuria complicating labor.

When does it usually make its appearance?

Generally not before the end of the third month, and most frequently about the sixth month.

What are the causes of puerperal albuminuria?

(1) Pressure of the gravid uterus on the renal veins. This hardly seems plausible during the early months, as the uterus has not reached a size sufficiently large to cause pressure upon these vessels. Later in

pregnancy this may be one of the causes. (2) Pressure upon the ureters by the uterus. (3) High arterial tension, due to the hydræmic condition of pregnant women. (4) High degree of nervous irritability. (5) Reflex irritability, associated with the glandular secretions.

Describe the course, symptoms, prognosis, and treatment.

1. *In the Ordinary Insidious Cases.*—The first and only positive symptom is the presence of albumin in the urine. The patient usually becomes somewhat anæmic, and an œdema of the extremities, oftentimes extending to the face and neck, is observed. Headache is usually frontal and constant, though it may not be severe and may be confined to one side only. Ringing in the ears is a constant and annoying symptom if the albumen becomes large in amount. Visual disorders are observed, such as double or blurred vision and black spots before the eyes. Vomiting, continuing throughout the day, and in women who have not previously been suffering from nausea. Excessive nervous irritability and neuralgic pains, or at times some form of paralysis. The pulse is small, hard, and rapid. If the patient remains without treatment, these symptoms become more marked. Vertigo and dizziness appear, and the visual disturbances become more and more severe, until at times blindness results. Digestive disturbances are very pronounced, and the patient has an acute attack of indigestion and an eclamptic seizure.

Prognosis.—The prognosis for the child is always grave, especially if the disease is persistent or far advanced when treatment is begun. The prognosis for the mother is good if she is seen early.

Treatment.—(1) Regulate the diet. This should consist exclusively of milk, the patient taking three or four quarts daily. If the symptoms are very persistent and the urine scanty, skimmed milk, having more of a diuretic action, is preferred. (2) Insist that the patient wear flannels next to the skin: they need not be heavy, but must be roomy and warm. (3) Regulate her mode of life, so that she shall take a proper amount of exercise and have plenty of fresh air. All excitement must be avoided. Her sleeping-room should be large and well ventilated, though care must be taken to avoid draughts or chilling of the body. (4) *Medicinal.*—This consists—1st, in drugs which reduce the congestion of the kidney and lower the arterial tension; and 2d, in those used to allay the nervous irritability. Among the first class the most important are laxatives. Compound licorice powder or an occasional dose of compound jalap powder is efficient, but perhaps best of all are the saline cathart, or mineral waters, given every other morning. Of the former, citrate of magnesia, sulphate of magnesia, and Rochelle salts are best. If the latter are used, Hunyadi and Villicabras are very excellent. Digitalis in small doses, combined with the acetate or citrate of potash, makes a very good diuretic mixture. If the anæmia is marked, the so-called iron lemonade already spoken of is indicated. Among the drugs given for nervous irritability the bromides are by far the best. After a thorough trial of treatment with no improvement in the patient's

symptoms and general condition, the only resource is to induce abortion or premature labor.

2. *In Acute Albuminuria*.—In this the outset is very sudden and severe. As a rule, it does not occur until the latter months of gestation—never until after the fourth month—and is usually seen in plethoric women. All the symptoms given above are present, but are more marked and severe. The urine becomes scanty, high-colored, and may contain epithelial scales and hyaline and granular casts. The pulse is full and bounding and almost incompressible. Vomiting is persistent.

The *prognosis* in these cases is good if the symptoms yield readily to treatment. If not, it is very bad.

Treatment.—If the patient be plethoric and pulse full and hard, abstract 12 or 14 ounces of blood from the arm. Then give a pure purgative—comp. jalap powder in dose of gr. xl–3j or calomel in gr. x–xx doses, combined with soda bicarbonate. Keep patient quiet and in bed, allow only milk, and if she is at all restless give her the bromides. The most satisfactory salt is the bromide of soda in gr. xx–xl doses, combined with chloral hydrate, gr. v–xv. If the symptoms subside, this will be all that is necessary. If not—and very rapidly too, for in these cases there is great danger of eclampsia—induce labor. But always try, if possible, to wait until the child is viable.

ECLAMPSIA.

What is eclampsia?

Eclampsia is an acute disease coming on during pregnancy, labor, or the puerperal state, and characterized by a series of tonic and clonic convulsions, affecting at first the voluntary muscles, and finally extending to the involuntary muscles, accompanied by a complete loss of consciousness and ending by a period of coma or sleep (Charpentier). It is more frequent during pregnancy and labor than after delivery.

What is the etiology of eclampsia?

Although all cases of albuminuria are not accompanied by eclampsia, the latter is probably always preceded by or accompanied with albuminuria; hence it is by most supposed that the disease is one of the manifestations of albuminuria. Primiparity is certainly a very decided predisposing cause, as is also an excessively distended uterus either from a multiple gestation or hydramnion. The *immediate* cause of the convulsion has been variously stated by different authors. Some have said that it is due to a cerebro-spinal congestion; others, that it is a neurosis caused by reflex irritation of the spinal system; others, still, believe that eclampsia depends upon a poisoning of the blood which renders it too impure to properly stimulate the nerve-centres; in other words, that by the impure blood the nervous system is practically poisoned. This is the most generally accepted theory, though what the poison is, whether urea or some other ingredient, is not known.

Describe an eclamptic seizure.

The attack will usually be preceded by some of the symptoms spoken of under the head of *Albuminuria*, such as œdema, vertigo, insomnia, cephalalgia, stupor, or blindness. The patient first feels a sense of dizziness, and if closely observed it will be noticed that the thumbs are turned inward across the palms of the hands. The head now turns to one side or in a backward direction; the eyeballs roll upward, so that only the sclerotics can be seen, and the angles of the mouth are drawn downward, giving the face a horrible expression. The face, which is at first very pale, now becomes deeply cyanotic, the glottis closes, and the veins of the neck are enormously swollen. The carotids pulsate violently. This tonic rigidity lasts from ten to twenty seconds, when the clonic spasms begin. The hands open and close, a violent twitching of the limbs and arms occurs, and the whole muscular system is thrown into rapidly recurring convulsive movements. Respiration is hurried and shallow, and is accompanied by a frothing at the mouth. This usually lasts no longer than three to five minutes, and is followed by a condition of coma. In a few minutes the woman opens her eyes, but nothing is distinct, and when consciousness is regained she has no recollection of what has taken place. It sometimes happens that the coma becomes deeper and the patient dies without recovering consciousness. When she recovers from a convulsion she is so extremely irritable that the slightest noise, or even draught of cold air, will immediately throw her into another convulsion. The remissions or periods between the seizures are variable. Sometimes but a few minutes intervene, while at others several hours may pass before a second attack occurs. There may be but one or two attacks or there may be sixty or eighty.

What is the prognosis of eclampsia?

If the temperature rises, the attacks are frequently repeated, and the introduction of a catheter brings away only a small quantity of high-colored urine; the prognosis is somewhat variable, although it is always bad. After delivery has taken place it is better, and the later in pregnancy it occurs the better the prognosis. About 40 per cent. of the cases recover. To the child the prognosis is always very grave.

What is the treatment of eclampsia when it occurs before labor has begun?

Immediately after the convulsion begins crowd a towel between the teeth to prevent biting the tongue, loosen all the clothing, and give plenty of fresh air. Do not restrain the patient, but allow her to thrash about as much as she pleases upon the bed; only keep her from falling out. As soon as the tonic spasm has passed let her inhale chloroform, but not to the surgical degree. When she is well out of the convulsion rupture the membranes and give a purge, preferably elaterine, gr. $\frac{1}{4}$, comp. powder jalap, 3ss-j, or calomel, gr. x-xx: if necessary, croton oil, $\mathfrak{m}\text{j}$ -ij, in olive oil, 3j. If the patient be plethoric with a bounding

pulse, abstract $\frac{3}{4}$ xij-xv of blood from her arm, and give morphine sulphate, gr. $\frac{1}{4}$, hypodermically, and repeat frequently enough to keep her well under its influence. Then soak a blanket in hot water, and wind this around the patient, covering with two dry blankets. Keep her in the pack three to four hours, and after taking her from it give chloroform and pass the catheter. If the patient has now been quiet for a few hours and the kidneys and bowels are acting well, and if the uterine contractions have not begun, a catheter may be introduced into the uterus to start the labor. During the pains always give chloroform.

Describe the treatment when a seizure occurs during labor.

Administer chloroform freely, and if the membranes are intact rupture them. This is often sufficient to check further convulsions. It is still a disputed point as to whether or not delivery should be hastened when the pains are forcible and efficient. This must be decided in each individual case.

How would you treat a case occurring after delivery?

Give chloroform enough to produce anæsthesia, then administer morphine hypodermically, or chloral hydrate, gr. xx, and sodium bromide, $\frac{3}{4}$ ss, by mouth or enema; produce free purgation, and keep the patient on milk diet until the albumin has disappeared from the urine.

What should be the after-treatment of eclampsia?

Milk diet until albumin has disappeared, iron—and as good a form as can be given is the iron lemonade—tonics, fresh air, favorable hygienic surroundings, and nourishing food.

DISEASES OCCURRING WITH PREGNANCY.

Naturally, the pregnant woman may contract any disease she would contract in the non-pregnant state, but as some diseases are very materially influenced by this condition, they will be spoken of.

What influence has pregnancy on the eruptive fevers?

When associated with gestation the eruptive fevers are usually very severe.

In small-pox would the woman abort?

If the type is severe, and especially if the temperature be high, the foetus, as a rule, dies and is soon expelled. On the other hand, pregnancy may continue, and on the birth of the child pitting will be found to show it to have suffered from the disease in utero. Cases are recorded of children having been born with small-pox. The confluent form is almost invariably fatal both to mother and child.

What can you say of scarlet fever and pregnancy?

Scarlet fever usually assumes a malignant type, and almost invariably

causes abortion. When this does occur death usually results from septicæmia, as the scarlet-fever germs cause this disease.

What can you say of pneumonia ?

This disease, when it does occur, is generally very fatal, both to mother and child. On account of the high and continuous febrile movement abortion is likely to result. This is especially true when the pregnancy is far advanced, and the more advanced the pregnancy the more likely is the pneumonia to terminate fatally.

What can you say of phthisis ?

This disease is probably aggravated by pregnancy, notwithstanding many opinions and views to the contrary; and it is certain that the offspring of tuberculous mothers is in many cases either scrofulous or tuberculous. Then, again, there is a greater tendency to abortion or premature labor in phthisical mothers.

What can you say of syphilis ?

Syphilis may exist before conception: it may be contracted during gestation or at the time when conception takes place. In all these cases there is a tendency to abortion, but the tendency is more marked in cases where syphilitic women become pregnant. Exceptionally, the child is born in a healthy condition, and remains so. More frequently, however, it shows evidences of the disease at birth or develops symptoms within a few months.

EXTRA-UTERINE PREGNANCY.

What different forms of extra-uterine pregnancy are met with ?

(1) Tubal, of which there are several varieties—viz. tubal proper, interstitial, tubo-ovarian, and subperitoneal; (2) abdominal; (3) “ovarian;” (4) pregnancy in a bilobed uterus; (5) pregnancy in a hernial sac.

What are the causes of ectopic gestation or extra-uterine pregnancy ?

These abnormal pregnancies usually occur after thirty years of age, and in women who have long been sterile, and are caused by anything interfering with the passage of the ovule through the tube from the ovary to the uterus. Among these may be mentioned inflammatory conditions of the tube, a narrowing of its calibre from old pelvic inflammations, tumors causing compression of the tube, polypi, etc. Fright or excitement is also thought by some to be a cause. The abdominal variety may be caused by the rupture of the sac of an ovarian or tubal pregnancy or by the failure on the part of the fimbriæ to grasp the ovule as it leaves the ovary, thus allowing it, after it has become impregnated, to fall into the abdominal cavity. Some say it may become impregnated by the passage of the semen through the tube and into the peritoneal cavity.

Describe the natural course of a tubal pregnancy.

The ovum is arrested in some part of the tube, and begins to develop just as in a normal pregnancy. The chorion develops, and upon it the villi appear, but no decidua is formed around the foetus. However, this is found in the uterus as in a normal pregnancy. No proper placenta is ever found. This may be due to the fact that rupture usually occurs before the time when it should appear. For a time the ovum grows, but soon the tube has expanded to its fullest extent; its fibres, by the prolonged and excessive stretching, draw apart; the tension from within causes the coverings to rupture; and the patient dies either from shock, hemorrhage, or peritonitis.

State the symptoms and diagnosis of a tubal pregnancy.

Exactly the same symptoms as occur in a normal pregnancy may be present, but, as a rule, those which are developed during the early months are the only ones ever seen, and these are very much aggravated. The nausea and vomiting begin very early, sometimes within a few days of conception, and the latter may be uncontrollable. Menstruation may cease, but at times during a menstrual epoch there is a sero-sanguineous discharge containing shreds of tissue (the decidua). Colicky pains appear in one side or another, and are severe. They may be accompanied by pains passing down the thighs, and inability to walk without great difficulty. The uterus enlarges somewhat, the cervix softens, the mammary changes are present, and all the symptoms of a normal pregnancy are seen.

Diagnosis.—On examination is noticed an excessively congested and red vaginal mucous membrane. The cervix is soft, and the uterus larger than normal, but there is not the tendency of it to lie over on the bladder as it always does in an ordinary pregnancy; hence the bladder irritability is not noticed. In the abdomen is found a tumor, which, unlike the uterus, lies to one side of the median line, and is painful on pressure. The above, accompanied by the colicky pains already described and the menstrual flow, should always lead one to strongly suspect an abnormal pregnancy, though a positive diagnosis may be extremely difficult unless a sound is introduced into the uterus, which will show this organ to be empty.

When does this form of pregnancy usually rupture if not interfered with? and what are the symptoms of rupture?

Rupture usually occurs between the first and third months, though it may take place as early as the second week, and cases are recorded where it has been delayed until the sixth month.

The *symptoms* of rupture of the tube are those of extreme collapse, and with this may be associated severe abdominal pains, pallor, cold extremities, a small, thready, and rapid pulse; vomiting, and possibly coma, accompanied by "air hunger" and restlessness, may be seen,

followed by death almost immediately; or these symptoms may not be so marked, and the patient rallies only to develop a violent general peritonitis, which results in death.

How should a tubal pregnancy be treated?

If the case is seen before rupture has taken place, there are several methods of *treatment* which have been pursued with varied success. One is to destroy the foetus. This has been done by means of the faradic current, which may be administered ten or fifteen minutes daily for a week or two. If the tension is removed and the cyst ceases to enlarge, it may be known that the child is dead. Then there is hope that it may remain inert in the tube. Another method of accomplishing the same end is the use of the galvanic current, the negative electrode being introduced into the vagina and pressed up against the tumor, while the positive is placed over the abdomen. Morphine and strychnine have also been injected into the sac to destroy the child, and with success in some instances. Probably the most modern and successful treatment is to do a laparotomy and remove the tube. If rupture has taken place, the only rational procedure is to stimulate the patient and perform a laparotomy, removing the blood, foetus, and tube.

Describe the course, symptoms, and treatment of an abdominal pregnancy.

This form of extra-uterine pregnancy generally goes to full term, while the tubal variety never does. The placenta forms on the peritoneum and adhesions are usually set up. The sympathetic disturbances met with in a normal pregnancy are all present. Menstruation may cease, but usually this is not the case, or if it does it ceases only for a short time; and it may be regular throughout. At times conception may occur again, and the woman bear a child to term in the uterus. Infrequent colicky pains are met with, but are not usually as severe as in the tubal variety. On examining the uterus it will be found but slightly enlarged, though the cervix is soft as in a normal pregnancy. The introduction of a sound shows the uterus to be empty. The foetal heart-sounds will be present and very loud. Palpation reveals the presence of the small parts of the child just beneath the hand. These cases may set up a peritonitis which results in the death of the mother, or they may go on to full term, giving no real marked symptoms at any time. In the latter case a pseudo-labor occurs. Regular uterine contractions take place, lasting for a variable length of time, and the foetus dies. When this occurs a retrograde action begins: the breasts and uterus atrophy, as also do the foetus and placenta. The liquor amnii may become absorbed, and the coverings of the foetus are clearly adherent to it, or maceration of the child may occur. Occasionally in the former cases the foetus is carried for years, and even a long lifetime, without causing any symptoms. As a rule, putrefaction results, and a peritonitis or septicaemia is set up, or a secondary inflammation takes place and the foetus is discharged piecemeal through the

abdominal wall, vagina, bowel, or bladder, most frequently through the abdominal wall.

Treatment.—If the diagnosis has been made certain, the treatment resolves itself into one of two courses:

1. *Primary Laparotomy.*—If done at all, this should be done when the child is at full term. The statistics in these cases are not at all favorable, though some good results have been obtained. It may be justifiable in some cases, and when it is done it is with the hope that adhesions may be found between the peritoneum and cyst. The placenta should not be removed, but left to discharge through the wound, a portion of which is left open. If no adhesions are found, the peritoneum must be stitched to the abdominal wall. Cut the cord as near the placenta as possible. The operation is almost invariably followed by septicæmia, but this may be of such a mild form that recovery will take place.

2. *Secondary Laparotomy.*—If this is decided upon either through choice or necessity, an incision is to be made where the mass points, whether this be through the abdominal wall, vagina, or rectum, and afterward the sac is washed out frequently with some antiseptic solution. Some have recommended the opening of the cyst by caustics when there is reason to believe that adhesions are not present.

What is “missed labor”?

This term is given to a class of extremely rare cases of utero-gestation in which the foetus is retained in the uterus for a variable length of time beyond term. Labor-pains begin and cease, or may never come on at all; the foetus dies and becomes decomposed, setting up a peritonitis, or it is expelled in pieces; or, as in abdominal pregnancies, cases are recorded where decomposition has not occurred, and the foetus has remained in the uterus for years, causing no untoward symptoms. The cause or causes of this occurrence are not well understood.

MULTIPLE PREGNANCY.

What can you say of the frequency of multiple pregnancies?

This varies considerably in different countries and among different races. Statistics have shown it to occur most frequently in Russia, where the proportion of twin to single gestations is about 1 to 50; however, the average is from 1 in 80 to 1 in 90 pregnancies.

State the causes of multiple pregnancies.

They are three in number: (1) Two Graafian follicles mature simultaneously, and each expels an ovule which becomes impregnated. They may both come from the same ovary or one from each. (2) One Graafian follicle containing two mature ova which become simultaneously impregnated. This is a double-yelked egg, as it were. (3) A single follicle, a single ovum, but two nuclei.

In twin pregnancies are the children likely to be of the same sex?

The most frequent combination is a male and female; the next in frequency is two females; and the least frequent two males.

How are the placentæ and membranes arranged in twin gestations?

(1) When two ova become impregnated, each one develops independently, and the result is two separate chorions, two amnions, two placentæ, and two cords. Occasionally it happens that the placentæ lie very close together, and eventually unite, but a thin line of union can invariably be seen.

(2) A single Graafian follicle, but two ovules. In this case there are two amnions, but only a single chorion. The placentæ are usually united, and from this come two cords.

(3) One ovule with two nuclei. In these cases there is a single amnion, a single chorion, and one placenta with two cords. The vessels in these instances are apt to anastomose in the placenta.

SUPERFŒTATION AND SUPERFECUNDATION.

What is superfœtation?

By this term is meant the impregnation of a second ovule when the uterus already contains one impregnated ovum. This must occur very early in pregnancy, else it is called superfecundation. The fact that it is possible is proven by the occurrence of twins of different nationalities or races being born to one woman.

What is superfecundation?

Superfecundation means the impregnation of a second ovule in a uterus containing an ovum somewhat developed. The possibility of this occurrence is proven in two ways: (1) By the fact that in some twin pregnancies one child is apparently at full term, while the other is seemingly premature. However, this is not a very good reason, as we know that the growth of two children in utero may not be equally rapid. One seems to take more of the nourishment, as it were. (2) A full-term child is born to a woman, and in a few months she gives birth to another, apparently mature, fœtus.

DISEASES OF THE OVUM, FŒTUS, AND DECIDUA.

What pathological conditions of the decidua are met with?

Acute inflammations are occasionally seen accompanying the infectious diseases. These almost invariably lead to abortion, and are not nearly as frequent as is the chronic condition of endometritis. There are three forms:

(1) *Chronic Diffuse Endometritis*, which consists in the formation of

a new connective tissue, making a much-thickened decidua if the pregnancy continues. It very frequently happens that the endometritis exists when impregnation occurs, and in these cases abortion will be very apt to result at an early stage.

(2) *Polypoid Endometritis*.—In these cases there is, besides the thickening of the mucous membrane, a growth upon its surface of small, smooth bodies, varying greatly in size and number, called polypoids. Pregnancy may go on to term, and the condition be discovered only after labor, or the growths may be so abundant as to interfere with the nutrition of the fœtus, causing its death, and abortion results.

(3) *Catarrhal Endometritis* or *Hydorrhœa Gravidarum* (?).—This is the collection of an aqueous fluid somewhere in the uterine cavity and its discharge by the vagina. The cause is unknown. Many believe it to be a rapid secretion from the uterine glands, and for this reason it has been classed with the forms of endometritis. If this be the case, the fluid collects between the decidua and chorion. Some think the accumulation is between the chorion and amnion; others, that it lies in a sac or cyst between the two membranes.

The *diagnosis* of this condition can only be made from a history of repeated watery discharges, no uterine contractions, and a tightly-closed os.

Treatment is not called for, as neither the pregnancy nor the health of the mother or child is in any way interfered with.

THE PLACENTA.

Describe placentitis.

This pathological condition may be caused by disease of the decidua or of the chronic villi. The result is a growth of new connective tissue and vessels, which causes a marked atrophy of the placenta. Many do not admit that this is an inflammatory disease, but consider it a transformation or organization of blood-clots which have formed in the placenta.

What other morbid conditions may be found in the placenta?

Calcareous deposits are sometimes met with. These vary in size and number. Occasionally but a few small areas are observed, while in other cases large spots are formed, covering nearly half the maternal surface. Fatty degeneration, which occurs in yellowish-white masses mixed with fibrous tissue, is of quite frequent occurrence. The effect of both the above upon the fœtus varies greatly according to the extent of the change. Some have thought the latter to be simply a physiological change occurring at term.

What alterations in the shape of the placenta may be found?

Though usually oval, the placenta may be round or even crescentic in shape. Then there may be formed one or several patches of placental

tissue entirely separated from the placenta. These are called “placentæ succenturiatæ.” They are of importance only from the fact that they may remain in the uterus after the placenta is expressed, and thus give rise to hemorrhage, or become decomposed, setting up a septicæmia.

THE CORD.

What can you say of the pathological conditions of the cord?

Unusually long cords are sometimes met with, but these give rise to no difficulties during gestation, excepting that they are more apt to become knotted. Then also there is a greater likelihood of prolapse during labor. Unnaturally short cords are also found. These may cause a prolonged second stage of labor. Knots of the cord are of infrequent occurrence, and result from the child in its movements passing through a loop. They are of little practical importance, as they are very rarely tight enough to interfere with the circulation, though cases are recorded where the death of the foetus has resulted from a tight knotting.

THE CHORION.

Name and describe the only important disease of the chorion.

Hydatiform Degeneration or Vesicular Mole.—It is a disease of the chorionic villi, and consists of a cystic degeneration resulting in the formation of small vesicles containing a clear fluid which resembles the liquor amnii. Some believe it to be due to the death of the foetus, others suppose it to be caused by syphilis or some other blood disease of the mother.

The *symptoms* are rather obscure, hence the *diagnosis* is difficult. The increase in the size of the uterus is, as a rule, more rapid than in a normal pregnancy, and no auscultatory signs can be found, nor will it be possible to obtain ballottement. It is usually accompanied by an aqueo-sanguineous discharge, frequently repeated, and perhaps containing small portions of the cysts. Upon the finding of this does a positive diagnosis depend.

The *treatment* consists, as soon as the diagnosis is assured, in immediately emptying the uterus. This may be done by the introduction of the fingers into its cavity and removing the mass, or by the use of a curette. In either case an intra-uterine douche must follow.

THE AMNION.

What is hydramnion?

Hydramnion, or dropsy of the amnion, is an excessive amount of fluid in the amniotic cavity. This disease may be but slightly developed, in which case it gives rise to few symptoms and is of little consequence, but when developed to a marked degree the symptoms are very distressing, and often alarming. In many cases the children are stillborn or die

soon after birth. It does not usually begin before the fifth month, and with the rapidly increasing size of the abdomen we are likely to find all the disorders of pregnancy due to a mechanical cause, such as dyspnœa, palpitation, constipation, etc., greatly exaggerated.

There is usually no difficulty in making a *diagnosis*. The foetal extremities are felt on palpation only with difficulty, if at all, and the heart-sounds can never be heard distinctly. The abdomen will appear large and tense, but the uterine tumor can be mapped out, which is not the case when dropsical effusions in the peritoneal cavity exist.

Generally the condition requires no *treatment*. If, however, as occasionally happens, the mother's health is endangered, it will be necessary to induce labor. This should be done by puncturing the membranes. If labor has begun, three dangers arise from a sudden withdrawal of the fluid: (1) A prolapse of the funis; (2) hemorrhage from sudden detachment of the placenta; (3) syncope, as sometimes happens from the rapid withdrawal of fluid from the bladder or the peritoneal or pleural cavities. Thus it is advisable to elevate the hips, that the fluid may pass away more slowly: place the hand tightly against the vulva, introduce only the index finger to the membranes, that the force of the flow may be regulated. Use a small stilette and rupture membranes during an interval between the uterine contractions.

THE FŒTUS.

Are the eruptive fevers transmitted from the mother to the fœtus?

They all may be, and, although the woman suffering from any of these diseases is likely to abort, it sometimes happens that pregnancy goes on to term. In these cases evidences of the disease may be found after birth, or labor may come on when the period of viability of the infant is reached, and within a day or two the child be attacked by the disease from which the mother is suffering.

From what inflammatory diseases may a fœtus in utero suffer?

Enteritis, pharyngitis, laryngitis, pleurisy, and peritonitis have all been observed—the latter with more frequency, however. It may not be developed until term, when the infant is born alive and lives for some few hours or days suffering from the disease.

Its *cause*, unless specific, is unknown, but has been attributed to blows on the abdomen, peritonitis, cold, and over-exertion on the part of the mother.

What eruptive diseases besides those already mentioned (eruptive fevers) affect the infant in the uterus?

Syphilis.—This is by far the most frequent disease transmitted by the mother to the fœtus. In some cases it causes its death, the mother aborts, and in the child are found evidences of syphilis, or the child may

be born alive, showing specific taint. In still another class of cases an apparently healthy infant is born which in a few weeks develops the disease. These different results are undoubtedly due to the degree of severity of the infection from which the mother is suffering. When syphilitic children are born alive, they are apt to be small and poorly nourished, and show some form of syphilide, most frequently the pemphigoid. If not found at birth, it will almost invariably develop later. Its seat is on the hands and feet and about the arms. From these points it spreads over the entire body.

Malarial Poisoning.—Children born in malarial districts are frequently found with enlarged spleens, and cases are related where regular paroxysms occurred in utero, the frequency varying with the type of the malady.

Lead-poisoning and *sewer-gas poisoning* also affect the foetus, but as a rule cause abortion.

What injuries may the foetus meet with in utero?

Fractures, either from falls or blows received by the mother or from defects of ossification and non-union in the epiphyses. Contusions and lacerations are also seen, though rarely. These are the result of injury sustained by the mother.

Congenital or Intra-uterine Amputations.—A child may be born with any one or all of the four extremities absent. It is believed that so-called intra-uterine amputations are caused by constrictions of the extremities by the umbilical cord or bands of false membrane. The latter theory is held by most.

MOLES.

What are moles? and what two varieties are seen?

A mole is a fleshy mass of variable size developed in the uterus and receiving its nourishment from this organ. There are two kinds—true and false moles.

Describe the true moles.*

(1) *Hydatid or Vesicular Moles* have already been described.

(2) *Ova Moles.*—These are merely blighted ova, and often become dissolved in the liquor amnii and pass away surrounded by blood. On microscopic examination chronic villi may be found.

(3) *Placental Moles.*—This form is found most frequently after abortion. A small portion of the placenta remains in utero, which after a time separates and passes away.

Name the classes of false moles.†

(1) *Sanguineous*, which are merely blood-clots.

* All true moles are connected with conception.

† False moles have nothing whatever to do with impregnation, and may be found in virgins.

(2) *Fleshy Moles*.—These consist of fibrin, and are simply blood-clots with the serum and coloring matter squeezed out.

(3) *Decidual Moles*.—These are masses of decidual tissue.

ABORTION, MISCARRIAGE, AND PREMATURE LABOR.

What is abortion or miscarriage?

Abortion or miscarriage consists of the expulsion of the fœtus before it is viable. Many consider the period of viability to be the sixth month, others the seventh, so that by some any labor occurring before the seventh month would be called a miscarriage. Up to the end of the third month the ovum is usually expelled entire. After this time the placenta generally comes away after the fœtus.

What can you say in regard to the frequency of abortion, and is it more common in primiparæ than in multiparæ?

As an abortion occurring during the early weeks is likely to pass unnoticed, we do not really appreciate the great frequency with which the accident occurs. It has been said that 90 per cent. of the married women who live to reach the menopause have at some time or another aborted. There is much discrepancy of opinion in regard to the frequency at different periods of pregnancy; however, the majority are of the opinion that abortion occurs most frequently between the second and fourth months. It is much more common in multiparæ, and is said to be more frequently met with in women who have borne three or four children.

How may the causes of abortion be divided? Name them.

I. Maternal; II. Paternal; III. Fœtal.

I. The maternal causes are—

(1) *Artificial*.—Violent exercise, coitus, lifting heavy weights, coughing, vomiting, blows, falls, compression by corsets, the use of a sound, and applications to the cervix.

(2) *Through the Blood*.—Fever of all kinds, especially the eruptive and those accompanied by high temperature; syphilis, anæmia, poison of lead, mercury, or sewer-gas, malaria, albuminuria, and the use of medicines.

(3) *Through the Nervous System*.—Shock, convulsions, over-suckling, and many nervous disorders.

II. *Paternal*.—Syphilis and coitus.

III. *Fœtal*.—Diseases of the amnion, chorion, placenta, and cord, and anything causing the death of the fœtus; placenta prævia.

What is the most frequent cause of abortion?

Syphilis produces by far the greatest number of miscarriages, as it may operate through either the father or the mother.

What can you say of the mortality resulting from miscarriages?

This depends considerably upon the causes, also somewhat on the

period of pregnancy. Dangers arise from hemorrhage, local inflammation, and septic infection. When the abortion is due to maternal causes or when legitimately done, the mortality is exceedingly small. On the other hand, when criminally done it is very great, as the woman usually places herself in the hands of an inexperienced physician, and very likely keeps on her feet until the pains begin. This, with exposure, makes the mortality as high as 50 per cent.

Give the symptoms of abortion ?

Early abortions resemble very much a profuse menstruation, and may give rise to no symptoms, or the patient may complain of a sense of fullness about the thighs, which is described most frequently simply as a feeling of discomfort. On account of the congestion in and around the uterus there will be a tendency to frequent micturition or defecation. The cervix will be soft and patulous, and possibly the os slightly dilated. When the accident occurs later in pregnancy, there are *two* constant symptoms, and their presence, with a history of the case, makes the diagnosis easy. These are *pain* and *hemorrhage*. The latter occurs first, and is a necessity; the former is due to uterine contractions. Occasionally these may be preceded by a feeling of malaise, headache, coldness of the extremities, and a slight rise of temperature, but these symptoms are vague and unreliable.

How would you make a diagnosis of a threatened abortion ?

A history of the stoppage of menstruation for only one period perhaps, associated with the early signs of pregnancy, a hemorrhage from the uterus, and possibly some pain, would justify one in concluding that abortion was threatened. After the diagnosis of pregnancy is certain the difficulty in recognizing an impending miscarriage is slight. There is a sanguineous discharge, and there may be pain. On examination the uterus is found low, the cervix patulous, the os is perhaps dilated, and the vaginal vault feels tense as though it were on the stretch.

How would you make a diagnosis of inevitable abortion ?

Unfortunately, the diagnosis of these cases is extremely difficult—unfortunately, for when an impending abortion becomes inevitable the treatment is materially different. If the hemorrhage be free and persistent, if there be considerable pain, and on examination the os is found dilated, abortion will usually occur. However, in spite of all this, there are cases where the hemorrhage and pain have ceased, the os has retracted, and pregnancy has gone on to full term. The only two conditions which can be said to render the abortion almost inevitable are the rupture of the membranes and the death of the foetus. Nevertheless, finding the following conditions present, we may feel pretty sure that abortion is inevitable: viz. severe pain, persistent hemorrhage, and a dilated os.

How would you make a diagnosis of incomplete abortion?

In these cases we get a history of pregnancy, followed by pain, hemorrhage, and the passage of blood-clots. Upon careful examination the latter are found to contain an ovum considerably advanced, but no placenta; or perhaps some shreds of tissue and membrane are found. The os will be dilated and the hemorrhage continuing. Passing the finger into the cavity of the uterus, we feel shreds of membrane adherent to its inner surface or a portion of the placenta or perhaps the whole of it. If this is discovered the diagnosis is made certain.

How would you make a diagnosis of complete abortion?

When the abortion has been complete the hemorrhage ceases, the uterus contracts firmly, the os closes, and the pain ceases.

What is the treatment of the different forms of abortion?

In a case where repeated abortions occur look for a cause. If the patient be syphilitic, treat this condition from the beginning of her pregnancy. Give her

Red iodide of mercury,	gr. $\frac{1}{4}$;
Iodide of potash,	gr. x.
Sig. <i>T. i. d.</i>	

The iodide of potash may be run up to gr. xx or 3ss, *t. i. d.*, without injury.

Another good treatment is by inunctions of the oleate of mercury. Where no specific cause is present, but the abortions occur time after time, keep the patient in for the few days during which she should menstruate, and allow her to take no exercise for several days before and succeeding this time. Do not allow her to have intercourse during the first four to six months, at any rate. Guard against nervous shock, extreme physical exercise, or anything that might irritate or congest the uterus. If a displacement of the uterus is present, restore it to its natural position, and keep it in place by a suitable pessary until its increasing size prevents it again becoming displaced. Diseases of the uterus and tubes must be treated before impregnation has occurred.

Two principles are to be observed in the treatment of all cases of threatened abortion, unless from a very foul-smelling discharge we know the fœtus is dead, in which case it should come away. These are absolute rest, both mental and physical, and the administration of drugs which will allay nervous sensibility and weaken muscular action. The first is obtained by placing the patient in bed in a darkened room; the second, by giving opium, chloral, and the bromides. Opium may be administered by the mouth, by the rectum, or hypodermically. A very excellent method of administration is in the form of suppositories given *per rectum*, bearing in mind the fact that women about to abort as a

rule display a marked tolerance of the drug, so that the dose must be large. With the opium we may combine moderate doses of chloral and the bromides. The fluid extract of viburnum prunifolium in 3j doses has been much used of late, and with some good results. If the bleeding stops and pain ceases, you may feel pretty certain that the emergency has passed. However, the woman should be kept in bed eight or ten days longer and at each succeeding menstrual period. As soon as you feel certain that no hope of checking the abortion remains, the treatment must be radically altered. The administration of any of the above drugs is absolutely contraindicated. If hemorrhage is free, a tampon must be immediately introduced. The best material for this is sterilized cotton made up in small rolls, and just before their insertion immersed in a solution of bichloride of mercury, 1 : 5000. Use a Sims speculum, and begin to pack closely in the vaginal fornices and in front of the cervix. After filling the whole canal apply a T-bandage. This may be allowed to remain from eight to twelve hours, and upon its removal the ovum will usually be found to come away with it. If not, give a douche of bichloride, and apply another. If the hemorrhage is slight, it will not be necessary to use a tampon. If the ovum has been passed and the hemorrhage continues, place the woman under the influence of ether, give a vaginal douche, dilate the cervix if it be not already dilated, and with a dull curette clean out the entire uterine cavity, afterward irrigating it thoroughly with a solution of carbolic acid, 1 : 100, made up with boiled water. The after-treatment of abortion is exactly similar to that pursued after a normal labor at term.

What is a premature labor ?

It is the expulsion of the child after the period of viability is reached, but before full term. Premature labor is conducted, goes through the same stages, and terminates just as a labor at full term, so that a further description of it here is unnecessary.

HEMORRHAGES OF PREGNANCY.

What forms of hemorrhage are met with during the first three months of pregnancy ?

We have (1) hemorrhage from the healthy mucous membrane of the vagina and the cervical canal. This may be of no moment unless it occurs from the upper zone of the cervix, in which case it will very likely lead to abortion. This form of hemorrhage usually takes place during a menstrual epoch, and leads the woman to believe she is menstruating. It is associated with no pain, and is due to a high arterial tension.

The *treatment* consists in lowering the tension by the administration of iodide of potassium in gr. xx doses, *t. i. d.*, saline laxatives, and the infusion of digitalis.

(2) Hemorrhages associated with ulcerations, erosions, and lacerations of the cervix date back before the pregnancy, but seem to be aggravated

by the hyperæmia due to the pregnant condition. The condition is readily recognized by an examination through the speculum, and the *treatment* is purely local, consisting in the application of tincture of iodine or persulphate of iron.

(3) In hemorrhage occurring with primary cancer of the cervix the cervix has an irregular indurated feel and bleeds freely upon the introduction of a speculum. There may also be a foul-smelling discharge. This form of hemorrhage, due to malignant growths, is naturally found rather late in life. If the woman be three months pregnant or less, abortion should be induced. If further advanced and the growth be localized and over a small area, it may be removed with the galvanic cautery. This is not likely to produce abortion, though it may. When the disease seems more extensive the question of an immediate hysterectomy, or waiting until the child is viable and then doing laparotomy, will arise.

During the last six months two kinds of hemorrhage are met with: (1) accidental, and (2) that due to an abnormal implantation of the placenta, or placenta prævia. This is also called "unavoidable hemorrhage."

Define and give the causes of accidental hemorrhage?

An accidental hemorrhage is that due to the premature detachment of a normally situated placenta. Two forms are met with: in one the blood finds its way between the chorion and decidua and escapes through the cervix: this is called the open form. In the other or concealed form the blood does not escape through the os, but collects within the uterus. The separation of the placenta is, as a rule, only partial, and, although there is usually an exciting cause, it generally occurs in women whose constitution has been undermined, perhaps from some chronic disease. It may be the consequence of general disease, such as scarlet fever, typhoid or typhus fever, and small-pox; or of local disease, as acute yellow atrophy of the liver, nephritis, etc. In the large majority of cases it is the result of undue exertion, blows, falls, strains, lifting heavy weights, coughing, etc. It is rarely found in primiparæ, and almost invariably only during the last two or three months of pregnancy.

Give the symptoms and diagnosis of the open form.

There may be a history of injury, followed, though perhaps not immediately, by a moderate or severe hemorrhage, and probably some pain over a localized portion of the uterus. A vaginal examination reveals the fact of a normal feel to the cervix and lower segment of the uterus, and also that this organ is the source of hemorrhage. This, with the history, makes the diagnosis easy.

Give the symptoms and diagnosis of the concealed form.

There are extreme collapse, exhaustion, perhaps syncope, pallid face, cool or cold extremities, disturbed respiration, and a small, rapid, and feeble pulse. Accompanying these there is excessive pain over some portion of the uterus, and in some cases its seat is marked by a promi-

nence caused by the accumulated blood. The localized pain and the tumor are apt to be present when the placental detachment has been central, and the margins, still remaining adherent, keep the blood confined to this small area. If the edge is detached, the blood flows out between the membrane and uterine wall, causing a severe pain from over-distension. Cases are recorded where the blood flows into the foetal sac through a rent in its membranes.

What can you say of the prognosis, and how would you treat a case of accidental hemorrhage?

When the blood appears externally the *prognosis* is not very unfavorable. However, in the concealed form it is very grave. In all cases it is much worse for the child than for the mother. The infant mortality is about 90 per cent., while the maternal is about 50 per cent.

Hemorrhage from the uterus can only cease by a contraction of its muscular fibres, thus closing the orifices of the open vessels; therefore, immediately when a case of accidental hemorrhage is seen, whether the os be dilated or not, rupture the membranes and apply an abdominal binder. This latter acts in two ways: first, it prevents the uterine cavity from filling with blood, and secondly, causes contractions of the organ on account of the irritation from its pressure. If the hemorrhage now ceases, do nothing more. Labor will usually come on within a few hours, and should be conducted as an ordinary case of late abortion. If the hemorrhage continues, deliver as rapidly as possible. When the cervix is enough dilated to allow of version being performed, turn and deliver. If not, dilate with Barnes' bags. Should the uterus not contract firmly after the birth of the child, and should hemorrhage continue, give an intra-uterine douche of carbolic acid, 1:100, or bichlor., 1:8000, at a temperature of 120° F. Compound tincture of iodine, ℥j-Oj, may be added to the douche should the hemorrhage persist. Then full doses of ergot must be given, *though never until the child is born*. The collapse should be treated by warmth to the surface, alcohol and hot water internally, rectal injections of warm water, and ether or alcohol hypodermically if necessary. The after-treatment, as in all cases of hemorrhage, consists in nutritious diet, good hygienic surroundings, and iron internally.

PLACENTA PRÆVIA.

What is placenta prævia?

The placenta is "prævia" when situated in the lower segment of the uterus, so that a portion of it lies partially over or completely covers the internal os uteri. When entirely covering the os it is said to be complete or central; when only partially covering the same, it is called marginal, partial, or incomplete placenta prævia.

How frequently does placenta prævia occur? State the causes.

The proportion of cases of placenta prævia is about 1 in 1000 or 1200 pregnancies. It occurs much more frequently in multiparæ than prim-

iparæ, and is more frequent among the poorer classes. This is explained by the fact that women in the lower walks of life are obliged to get up too soon after delivery, leaving the uterus in a condition of subinvolution. It is also more often seen in women who have borne children in rapid succession and whose uteri remain abnormally large. Thus the cause seems to be a large uterus, though disease of the endometrium and uterine contractions occurring soon after conception are also given as causes.

Describe the symptoms of placenta prævia. *usually absent*

Hemorrhage is the one important and characteristic *symptom*. This may occur during pregnancy or not until labor has begun. The quantity of blood lost may be but small at first, and the hemorrhage is spontaneously arrested, or within a few days or weeks there will be a recurrence, and each time, if the patient survive the first loss of blood, the quantity is increased. The blood is bright, and the loss is associated with all the general symptoms of hemorrhage. There is no pain, and the flow may, and usually does, occur without any appreciable cause. It many times takes place during what should have been the menstrual period, and usually not until after the sixth month—frequently a few weeks before, or even during, labor.

What is the immediate cause of the hemorrhage and the source of the blood?

Various theories have been advanced to explain the cause of the hemorrhage in placenta prævia. By some it is thought there is a loss of proportion between the placenta and uterus, and necessarily a separation occurs. This is said by some to be due to a more rapid development of the uterine wall than of the placental tissue (Cazeaux), while others claim that the placenta itself grows more rapidly than the lower segment of the uterus (Barnes); others, again, think the hemorrhage due to causes which give rise to accidental hemorrhages, only that these causes are more apt to operate when the placenta is abnormally situated low down in the uterine cavity.

The source of the hemorrhage is the lacerated uterine vessels. A little dribbling may take place from the placenta itself, but thrombi soon form in the mouths of these vessels, closing them.

Is the prognosis favorable in placenta prævia? and would it ever be justifiable to allow a pregnancy to continue where a diagnosis had been made?

The *prognosis* is very grave both for the mother and child, but especially so for the latter. Various authors estimate the maternal mortality at from 9 to 30 per cent., and for the child 50 to 75 per cent. The evils to the mother are both immediate from the loss of blood, and subsequently from septic troubles. The great liability to this latter is due to several causes: (1) Infection from manipulations; (2) access of air to

the uterine sinuses; (3) extreme anæmia from hemorrhage; (4) formation of large thrombi, which decompose. It is never justifiable to allow a pregnancy complicated by placenta prævia to continue.

How would you diagnose and treat a case of placenta prævia?

The *diagnosis* may be made first by the sudden occurrence of a hemorrhage from the uterus with no apparent cause and associated with no pain or irregular contour of the abdomen, and secondly by the vaginal examination. Upon the introduction of the finger, if the os be dilated, the placenta may be felt as a soft, boggy mass through which the presenting part is only indistinctly appreciated. This can be readily differentiated from a blood-clot, which is readily broken down by slight pressure of the examining finger. On sweeping the finger about close to the uterine wall the diagnosis of a central from a marginal attachment may be ascertained. If the cervix is tightly closed, it will be found to have a boggy, œdematous feel; a scarcely recognizable presenting part is found; and, though it be associated with difficulty, the finger can usually be pushed through the os and the placenta felt.

Treatment.—Do not adopt an expectant plan and wait, but proceed at once to deliver the woman. Authorities differ on the subject. Many advise, if the child be not viable and if the hemorrhage be slight, using means to check the hemorrhage and allow the pregnancy to continue. These place the woman on a hard bed, apply ice-cloths to the lower part of the abdomen, give acidulated drinks, and keep her at perfect rest. This might be permissible in a hospital case, where the patient is under close and constant observation, but when not under these surroundings it should never be considered, for a hemorrhage might occur at any time and death result before aid could be summoned.

When delivery is decided upon, one of several courses may be adopted: (1) Tamponing the vagina; (2) rupture of the membranes; (3) separation of or boring through the placenta and doing version; (4) induction of labor by the introduction of a gum-elastic bougie and by tamponing the vagina. Each individual case will suggest the method to be adopted. If the hemorrhage occurs when labor has begun, and the cervix is dilated sufficiently to allow the introduction of two fingers into the uterus, and if the placental attachment be only marginal, introduce the hand into the vagina, pass the two fingers through the cervix, push the edge of the placenta to one side, rupture the membranes, and by combined manipulation do a podalic version. (The bipolar or Braxton-Hicks method of version will be described later.) Pull down a leg and allow the labor to progress. This half breech acts as an efficient tampon, and will check the hemorrhage. If the attachment be central, push the fingers through the placenta and proceed to pull down a leg as before. If the hemorrhage occurs before the os is dilated or before it is dilated enough to allow the introduction of the two fingers, and if it be severe, introduce a vaginal tampon, and allow it to remain six or eight hours; then remove. By this time the labor-pains will have begun, and the

cervix will usually be sufficiently dilated to allow of the version being performed. If not, introduce a flexible bougie, and allow it to remain in the uterus until labor is well under way and the cervix sufficiently dilated to permit a version to be done. If the cervix is not dilated, but the hemorrhage ceases, the introduction of the bougie is indicated without tamponing, as this excites uterine contraction.

CHAPTER IV.

LABOR.

PHENOMENA.

Define the term "labor," and state the most modern theories as to its cause.

Labor is the act by which the fœtus and its annexes are expelled from the maternal organism. The *causes* are classified as—(1) determining, and (2) efficient. Among the determining causes may be mentioned fatty degeneration of the decidua which occurs at the end of pregnancy. Through this degeneration and separation the nerves over the interior of the uterus become irritated and excite contraction. Another theory is that the extreme distension of the uterus causes its contractions; still another has attributed it to an ovarian excitement at a menstrual period; and another to a fatty degeneration in the placenta and an accumulation of carbolic acid in the sinuses. However, no single theory has as yet been advanced which is not open to many objections.

The efficient causes are two: contractions of the uterus, aided by contractions of the abdominal muscles.

What is the character of the uterine contractions and the value of the intermittent pains?

The uterine contractions or labor-pains (for the words are used synonymously) begin in the lower part of the back, pass around the abdomen, and at times down the thighs. At first occurring at regular but infrequent intervals, they gradually become stronger and more frequent until, toward the termination of labor, but a very short interval occurs between the contractions. These contractions are absolutely involuntary, but may be influenced by mental impressions. They may be completely checked for a time or their power lessened by the appearance of a stranger in the room, a sudden surprise, or a disagreeable communication. Each contraction begins and gradually increases to its maximum intensity; the uterus becomes tense and rigid, then relaxes, and the pain slowly subsides. The contractions are said to pass in a wave from the lower zone

upward by a peristaltic action, then return downward. And they alternate in severity: first, a severe, then a moderate contraction.

Nature provides for the intermittence of the pains, for no woman could survive an ordinary labor were the contractions continuous. Nor could the child, for pressure upon it and the narrowing of the utero-placental vessels during a contraction so interfere with the circulation that asphyxia and death would result were they not intermittent. During the intervals the patient regains strength and the uterus returns to its oval shape; respiration becomes more nearly normal; the pulse, which has been accelerated during the pain, slows; and there is a general relaxation of the whole muscular system.

What signs or symptoms precede the beginning of labor?

Occasionally there are none, but as a rule a few days before labor begins there is the so-called "falling of the womb." The inferior segment of the uterus sinks down into the pelvic cavity and the fundus recedes from the diaphragm. The woman notices that the waist, which has been continually growing larger, becomes smaller, and respiration is easier. On account of this descent bladder irritability is apt to be more marked, and a very frequent desire to micturate is noticed. Edema of the lower extremities is likely to be aggravated, and if hemorrhoids be present they become very troublesome. A diarrhœa may occur. A few hours before the uterine contractions begin the mucous discharge from the cervix is more abundant, and may be tinged with blood. This is called the "show," and, if noticed, is a pretty sure sign that labor is not far off. On vaginal examination the lower uterine segment is found lower down in the pelvis, the cervix can no longer be felt, and an excessive mucous secretion is observed.

What are false pains?

They are the pains which occasionally occur near the approach of labor, and may be mistaken for true labor-pains. They are distinguished from the latter by the fact that they are confined to some portion of the abdomen, are very irregular in frequency and severity, and are not associated with a dilatation of the os, nor is any "show" present.

What are the stages of labor?

The course of a labor from the time the first pain begins until the placenta is born has been divided into *three* stages. The *first* begins with the true uterine contractions, and ends when the cervix is *completely* dilated. The *second* begins with the complete dilatation of the os, and ends with the birth of the child. The *third* is the period from the birth of the child to the permanent contraction of the uterus after the delivery of the placenta and membranes.

What influence have the pains of the different stages upon the physical condition of the mother?

The pains of the first stage of labor are entirely under the control of

the sympathetic nervous system, are involuntary, and therefore cause little or no exhaustion of the vitality unless very long continued, and even then the exhaustion is owing to the lack of sleep and rest more than to the pains. However, during the second stage the cerebro-spinal system comes into play along with the sympathetic, and during each contraction the woman strains. Now the exhaustion begins, and a very prolonged second stage may give rise to extreme prostration.

Describe the first stage of labor.

As the painful uterine contractions commence dilatation of the cervix and os begins. Usually slight and infrequent in the beginning, the pains gradually increase in severity, frequency, and duration, until, as the os approaches complete dilatation, a very short period intervenes between them, and each contraction is severe enough to call forth a cry or a groan from the mother. During this stage the woman is not confined to the bed, but is sitting up or walking about. The amount of pain experienced varies greatly according to the temperament of the patient. In neurotic women it is generally very great. The dilatation may be accompanied by nausea and vomiting which are of a purely reflex character. Usually the secretion becomes more stained with blood as the dilatation of the external os progresses. This may be due to slight lacerations of the os or to more serious tears of the cervix. As a rule, when the dilatation is nearly or quite complete spontaneous rupture of the amniotic sac takes place, and most of the liquor amnii drains away. If a vaginal examination be made at the beginning of labor, the dilatation will be slight, and both orifices of the cervix may be appreciated, but as labor advances the cervix becomes thinner and thinner until nothing but a thin circular ring can be felt. During a contraction this becomes very hard and protruding: through it can be felt the tense hemispherical bag of waters. It occasionally happens that the amniotic sac ruptures prior to or very soon after the beginning of labor. In this case the labor is called a "dry" one, and is usually much prolonged.

Describe the second stage of labor.

As soon as the os has become completely dilated and retracts over the presenting part the character of the pains alters materially. With each uterine contraction the patient takes a deep inspiration, and involuntarily grasps with her hands the edge of the bed, the bed-clothes, or the hand of some bystander, and, bracing her feet, strains or bears down. In this way the abdominal muscles are brought into play, and with each contraction the presenting part descends into the pelvis. As the head passes the pelvic outlet the vagina dilates and the perineum begins to stretch. With each contraction, which now becomes stronger and more frequent, the tension of the perineum increases and the vulvar orifice expands, exposing to view a part of the head. During the intervals between the pains the elasticity of the perineal structures pushes the head backward and conceals it from view until the succeeding contraction of the uterus

occurs. Owing to this recession and advance the dangers of laceration are diminished, as the parts have an opportunity to become thoroughly stretched; and this is carried to a marked degree, owing to their great dilatability. The urethra is pushed upward; the anterior wall of the rectum bulges, and if faecal matter be present it is expelled. The crown of the head now protrudes farther, and does not recede in the intervals between the pains, and finally, during the height of a contraction, the head slips over the perineum. The shoulders and remainder of the body are soon expressed, and the birth of the child is followed by a sudden flow of amniotic fluid mixed with blood. The contractions now cease for a time, when the third stage of labor begins.

Describe the third stage.

It occasionally happens that immediately the child is born the placenta follows or is forced out of the uterus into the vagina. However, as a rule, the intermittent uterine contractions cease for a short time after the birth of the child, but soon begin again. The muscular fibres retract in all directions, and the placenta becomes separated and eventually expressed. The maternal vessels are naturally torn by this separation, but, owing to firm, tonic contractions of the walls of the uterus and the formation of coagula in the mouths of the vessels, hemorrhage is prevented.

What effects has labor upon the mother?

The appetite is lessened or wholly absent. The secretion of urine is increased. The perspiration is increased. The temperature is elevated. Mental disturbances, often to a marked degree and very variable in their character, are sometimes present.

What effects has it upon the child?

During a uterine contraction it is compressed, the placental circulation is interfered with, the foetal heart beats more slowly, and partial asphyxia results. The head is compressed during its passage through the pelvis, and its shape is altered. Meconium is often discharged from the rectum, and the bladder evacuated during or immediately following the birth of the body.

What can you say in regard to the duration of labor?

The duration of labor is influenced by many circumstances referable to both mother and child. Age, civilization, mode of living, multiparity and primiparity, as well as the size and presentation of the child, determine the duration. First labors are almost invariably longer than subsequent ones, and in old primiparæ they are usually very prolonged. The average duration is said to be from twelve to fifteen hours. In primiparæ labor may be lengthened to sixty or seventy hours in exceptional cases. The ratio between the first and second stages is, roughly speaking, 5 to 1.

PRESENTATION AND POSITION.

What is understood by the words "presentation" and "position"?

By "presentation" is understood the part of the child which offers itself or presents at the superior strait or inlet of the pelvis. There are three recognized presentations, all of which are subdivided: (1) those of the head, which are most frequent; (2) those of the pelvic extremity, next in frequency; (3) those of the trunk, which are the least frequent.

By the term "position" is understood the relation of the presenting part to, certain fixed points upon, and the diameters of, the superior strait of the pelvis.

Why does the head present most frequently?

The head presents in over 90 per cent. of all cases. Explanations for this are numerous, but there are many objections to each. Pajot's law of accommodation is considered one of the best reasons for the great frequency of vertex presentations. It is this: "When one solid body is contained in another, and if the latter is alternately in a state of motion and of repose, and if the surfaces are rounded and smooth, the included body constantly tends to accommodate its shape and dimensions to the shape and capacity of the containing body."

The fact that the centre of gravity is situated nearer the head of the foetus, tending to cause this part to lie in the lower segment of the uterus, is considered by some the cause. Others consider the reason to lie in the shape of the uterus and foetal mass. The large extremities should correspond, and if this is the case the head must lie in the smallest and lowest portion of the womb.

MECHANISM IN VERTEX CASES.

How many positions of the vertex are there? Name and describe each.

There are four:

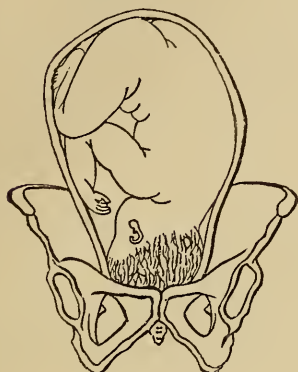
(1st) *L. O. A.* (Fig. 11).—In this position the occiput is directed toward the front and left side of the mother; the sinciput points posteriorly and to the right sacro-iliac joint, and the long diameter of the head lies in the right oblique diameter of the pelvis.

(2d) *R. O. A.*—In this position the occiput is directed toward the front and right side of the mother, the sinciput posteriorly and to the left sacro-iliac joint, and the long diameter of the head lies in the left oblique diameter of the pelvis (Fig. 12).

(3d) *R. O. P.*—This is exactly the reverse of the first. The forehead points to the left side of the mother, the occiput to the right sacro-iliac joint, and the long diameter of the head lies in the right oblique diameter of the pelvis (Fig. 13).

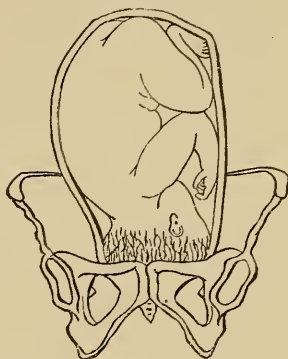
(4th) *L. O. P.*—This is the reverse of the second position. In it the occiput points to the left sacro-iliac joint, the sinciput to the right side

FIG. 11.



L.O.A.

FIG. 12.



R.O.A.

of the mother, and the long diameter of the head lies in the left oblique diameter of the pelvis (Fig. 14).

FIG. 13.



R.O.P.

FIG. 14.



L.O.P.

Which is the most frequent of the vertex positions?

The first position, or *L. O. A.* About 70 per cent. of all vertex cases present in this position. The next in frequency is the third, then the second, and the least frequent the fourth.

Numerous reasons have been given to account for the greater frequency of the first position, of which the most rational is that the left oblique

diameter of the pelvis is shorter than the right. This is owing to the position of the rectum.

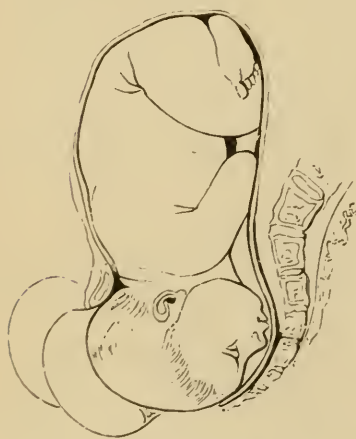
Describe the mechanism of delivery in the first position.

For convenience of description the movements are usually divided into stages, though ordinarily these stages gradually run one into another, so that they cannot be made out in actual practice: (1) period of flexion; (2) period of descent or engagement; (3) period of internal rotation of the head; (4) period of descent and extension; (5) period of external rotation of the head and internal rotation of the trunk; (6) period of expulsion of the trunk.

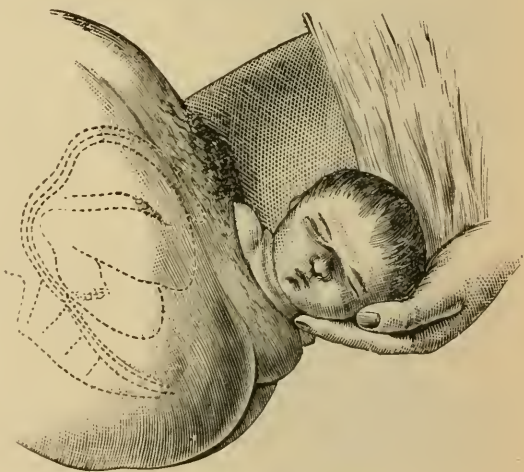
When labor begins the occiput is at the left ilio-pectineal eminence, and the sinciput at the right sacro-iliac synchondrosis. The back of the child looks forward and to the left side of the mother, and the abdomen backward and to the right. The head is only partially flexed, but as soon as the uterine contractions begin this flexion becomes more marked, and there is substituted for the occipito-frontal diameter ($4\frac{1}{4}$ inches) the suboccipito bregmatic ($3\frac{3}{4}$ inches), giving a gain of more than $\frac{1}{2}$ inch.

FIG. 16.

FIG. 15.



Extension of the Head.



Restitution of the Head.

The reason of this flexion is owing to the fact that the vertebral column is not articulated in the centre of the skull, but nearer to the occiput, and, meeting equal pressure from below, and the force from above being transmitted through the vertebral column, the sinciput is forced upward. Descent now occurs. The head becomes engaged in the pelvis, and from now on until its birth this movement goes on continually. The important movement of internal rotation now takes place by which the long diam-

ter of the head becomes adapted to the longest diameter at the outlet of the pelvis. This movement may not occur until the head has reached the perineum and is about to be born. However, it usually takes place higher up, and is due to several causes: First, according to Pajot's law of accommodation (p. 78), the head must accommodate its diameter to the diameter of the maternal pelvis. Secondly, owing to the direction of the inclined planes of the pelvis the occiput is directed forward and the sinciput backward. Thirdly, the perineal influence after the head has reached this body may greatly influence its rotation, if this be not already complete. The head, having now reached the perineum, is born by a process of extension (Fig. 15). The occiput becomes fixed beneath the symphysis pubis and the face sweeps over the perineum. External rotation of the head, or restitution, takes place after extension (Fig. 16). The occiput turns toward the thigh of the mother, which corresponds to the side of the pelvis which it originally occupied; in the first position, to the left thigh. The shoulders rotate, so that their long diameter is in the antero-posterior diameter of the pelvic outlet, the anterior or right shoulder becomes fixed under the symphysis, and the left or posterior is born first. The shoulders being born, the body immediately follows.

Describe the mechanism of delivery in the second position.

In the second position, R. O. A., the long diameter of the head lies in the left oblique of the pelvis. The movements are exactly the same as in the first position, excepting that the rotation takes place from right to left internally and from left to right externally.

Describe the mechanism of delivery in the third position.

In the third position, R. O. P., the occiput is directed backward and to the right sacro-iliac synchondrosis, the forehead forward, and the long diameter of the foetal head lies in the left oblique diameter of the pelvis. The first movement is one of flexion. Then comes descent, which takes place more slowly than in the anterior positions. Rotation now occurs, and is usually prolonged on account of the distance through which the occiput must pass. It rotates from behind forward, and in this rotation naturally turns to lie in the second position before it is completed. Extension, restitution, and expulsion of the trunk follow as in the preceding position, restitution taking place so that the occiput points to the right thigh of the mother.

Describe the mechanism of delivery in the fourth position.

In this position, L. O. P., the occiput points posteriorly to the left sacro-iliac synchondrosis, and the long diameter of the head lies in the right oblique of the pelvis. Flexion takes place, then internal rotation from left to right, during which the head comes to lie in the first position; extension, restitution, so that the occiput points to the left thigh of the mother, and expulsion now follows.

In the third and fourth positions it sometimes happens that flexion

does not take place to a sufficient degree, in which case descent occurs without internal rotation. This being the condition of affairs, the occiput is born over the perineum and the face under the symphysis, not by a process of extension as in the preceding cases, but by flexion. These are extremely difficult and tedious labors, and will be spoken of more fully later.

What is the caput succedaneum? and how is it formed?

It is an œdematous tumor of variable size developed upon some part of the foetal head during labor. Its situation varies according to the presentation and position, and it is produced by an effusion from the obstructed venous circulation caused by the pressure upon the head. The swelling occurs on the uncompressed part, and in the first and fourth positions is situated upon the right parietal bone, while in the second and third it is upon the left. In prolonged labors, where the membranes have ruptured early, it is likely to be very large, and may be entirely absent in rapid labors.

What alterations take place in the head during labor?

It is moulded so that some of the diameters are increased, some decreased. The occipito-mental and the occipito-frontal are almost always diminished, and the suboccipito-bregmatic may be. This moulding is effected by the overlapping of the bones on account of their incomplete ossification, and by the existence of the sutures and fontanelles. A few days after birth the head regains its normal shape.

ABDOMINAL PALPATION.

What may be accomplished by abdominal palpation?

By abdominal palpation we may discover the position of the fundus of the uterus, the relative amount of liquor amnii, the position and presentation of the foetus, and in many cases where abnormalities exist they may be rectified before labor begins.

Describe briefly the method of performing palpation.

The woman lies on her back on a hard bed, or preferably a table, with her head and shoulders slightly elevated, the legs flexed at the knees and the thighs on the pelvis. The arms should lie extended by the woman's side, and the abdomen exposed from the waist to the pubes. The accoucheur stands on the *right* side of the patient. His hands should be warm, to prevent reflex abdominal muscular contractions.

The position of the fundus is first ascertained by placing the hand on the abdomen, immediately above the symphysis, and carrying it upward. Over the uterine tumor marked resistance is encountered, but this ceases above the level of the fundus. We then seek for the presenting part. This is done by placing the hands flatly upon the lateral walls of the abdomen parallel to the iliac fossæ, and slowly depressing them. After having determined the extremity of the foetus which is presenting, we

seek to find the position of the back by passing the hands, one over the other, upward on each side of the abdominal wall.

How is a vertex presentation recognized?

By deep downward pressure in the iliac fossæ a round, hard, and usually slightly movable mass is felt nearly in the median line. This is the head. If the flexion be marked, it will be noticed that one hand meets with less resistance, and may be depressed more deeply, than the other. This will be upon the side toward which the occiput points, and is due to the fact that the opposite hand meets with the resistance of the forehead, which on account of the flexion must rise higher out of the pelvis. Passing the hands upward, if the position be either first or second, the smooth, even, resisting surface of the back is felt on the right or left side extending nearly or quite to the median line, while on the opposite side a non-resisting surface is encountered, and many times some of the extremities of the fœtus may be distinctly appreciated. If the position be the third or fourth, part of the back can still be felt, but only a small area, and this lying more to the right or left side. Much less resistance is noticed in the median line and on the opposite side, and the small parts are often distinguished over the anterior abdomen wall. Where the abdominal muscles are relaxed and palpation made easy, as the hands are passed upward after encountering the head they sink into a slight depression or furrow, the neck, and meet immediately above this the resistance of the shoulder. The breach generally lies in the opposite side of the fundus, from which the occiput points below and forms a rounded though larger and less resisting mass than the head. It may be distinguished from the head by the absence of the furrow spoken of above, and the fact that near it, as a rule, small parts may be felt.

How may a breech presentation be recognized by palpation?

On depressing the hands in the iliac fossæ we immediately appreciate a different condition than when the head presents. The mass seems broader, less rounded, not so resisting, and, above all, immovable or nearly so. Upon passing upward no furrow is felt, and small parts may even be made out here at the lower segment of the uterus. The back is recognized in the same manner as in normal vertex presentations. We then search for the head at the fundus. It almost invariably lies to one side or the other, and may be distinctly felt with its furrow at the neck, and the shoulder lies immediately below. If there be a sufficient quantity of liquor amnii—in other words, unless the amount be very much below the normal—by placing the fingers over the head and by a quick movement depressing the abdominal wall, the head is pushed away and returns, striking the fingers with an appreciable shock. This is called cephalic ballotement. This same sensation cannot be gotten with the breech at the fundus.

The *diagnosis* of the abdominal presentations and positions by abdominal palpation will be spoken of farther along, when these are taken up.

DIAGNOSIS OF VERTEX PRESENTATIONS.

Where is the foetal heart heard most distinctly in the several positions of the vertex?

In the first position the point of maximum intensity of the foetal heart is a small area situated about midway between the umbilicus and the antero-superior spine of the ilium on the left side; in the second position over a corresponding area on the right side; in the third position, though the point of maximum intensity may be the same as in the second, it is usually found farther around toward the mother's side. The same may be said of the fourth position, except that it is farther around on the left side, or over the same area as in the first position. In all vertex cases the foetal heart is most distinct at some point *below* a line drawn horizontally, so as to divide the uterus into two equal parts.

How may the vertex positions be diagnosed by vaginal examination when labor has begun and the cervix is partially dilated?

By introducing one, or preferably two, fingers into the vagina and through the cervix, if the membranes are ruptured, they come directly in contact with the parietal bones. Now, by passing backward a narrow membranous interval is felt, which is the sagittal suture. This should be traced by the fingers to determine in which direction it lies. If it passes obliquely from before backward and from the left toward the right, the position must be either the first or the third, but if it passes from right to left, the position will be the second or fourth.

The suture is now followed to determine the position of the posterior fontanelle, and, finding this, we know where the occiput lies. In the two anterior positions, the first and second, the posterior fontanelle is felt anteriorly or nearer the abdomen of the mother, and may be distinguished from the fact of its being smaller, more triangular-shaped, than the anterior, and running into it the arms of but three sutures are found. These are the sagittal and the two arms of the lambdoid. As a rule, unless the head be very small, the anterior fontanelle cannot be felt, as it lies too high up and too far posteriorly to be reached. This is due to the extreme flexion. In the two posterior positions it is generally possible to feel both fontanelles, owing to the lack of marked flexion which is usually present in these cases. Here it is necessary to distinguish between the two, and this may be done by feeling the four sutures running into the anterior fontanelles—the sagittal, frontal, and two arms of the coronal. This fontanelle is also much larger than the posterior, and is diamond-shaped.

MANAGEMENT OF NATURAL LABOR.

What should an obstetrical bag contain?

A well-equipped obstetrical bag should contain a stethoscope, a pair of forceps, a set of hydrostatic dilators, a Davidson's syringe, several

flexible rubber catheters and one silver female catheter, a pair of scissors and tape for tying the cord, some small and heavy catgut sutures, several needles, a needle-holder, two glass douche-nozzles, a rubber douche-bag, a hypodermic syringe, and plenty of absorbent cotton. It should also be provided with bottles holding chloroform (3jv or 3vj); fluid extract of ergot; pure carbolic acid, 3vj; a solution of the subsulphate of iron, 3iv; a small quantity of Magendie's solution of morphine; a solution of chloral hydrate, gr. x or gr. xv to the drachm; a solution of ergotin; ether and brandy for hypodermic use; and tablets of corrosive sublimate.

In choosing the room for confinement what points should be observed?

It should be large, well ventilated, well lighted, free from sewer-gas or other unwholesome and obnoxious vapors. A room with a southern exposure, containing several windows, is most desirable, on account of the greater abundance of sunlight it affords. Always, if possible, choose a room containing an open fireplace, and have all unnecessary furniture removed.

What can you say in regard to the confinement bed?

Choose a high, narrow cot, and have it situated so that you may get on all sides. It must be away from draughts of air, and in such a position that good light is secured. The mattress should be firm, smooth, and free from all little irregularities. Over it is placed a rubber protector, and upon this a linen sheet. Under the woman's buttocks a second sheet, folded three or four times, should be placed to absorb the discharges. The coverings over the patient must be so arranged that they may be easily adjusted or removed if necessary.

How should a patient be prepared for her confinement?

If the bowels have not been moved very recently, an enema of one or two pints of warm water and a little soap should be given. The genitals are then to be carefully washed with a solution of bichloride of mercury, and a warm vaginal douche of the same antiseptic, in the strength of 1:5000 or 8000, should be given. An entirely clean set of under-clothing is to be put on, and over this a loose, light wrapper.

What should be ascertained on the first visit to a woman in labor?

First, that everything is in readiness for the birth; second, that the woman has been properly prepared for her confinement; third, the presentation and position of the child, the general condition of the woman, and the frequency, character, and strength of the uterine contractions; fourth, whether or not the child is living.

How should the first examination be made?

After the physician has carefully washed and dried his hands he should palpate and auscult the patient's abdomen, and after again recleansing his hands and immersing them for a minute or more in a solution of corrosive sublimate, 1 : 1000, he should make a careful vaginal examination. If the labor-pains have begun, the fingers must be introduced during the interval between the contractions, and should not be withdrawn until the size of the pelvis, the amount of dilatation of the os, and the presentation of the child have been carefully ascertained. This latter will have been made out on palpation, as will also the position, but the former may be confirmed by the vaginal examination. As a rule, the membranes are tense and bulging, owing to which the examiner is prevented from appreciating the sutures and fontanelles. For this examination the patient should lie upon the back. Now, if the presentation be normal, the cervix only slightly dilated, and the patient a primipara, the presence of the physician is unnecessary, and he may with safety leave the woman for an hour or two, but never unless he be within easy reach.

Describe the management of the first stage of labor.

During this stage the patient should not be confined to the bed, but encouraged to walk about the room or recline in a chair. If the stage be at all prolonged, she must be advised to take food in moderate quantities. Beef tea, broths, milk—in fact, any light nourishment—should be taken at intervals to prevent exhaustion. Vaginal examinations are made only at infrequent intervals, and often enough for the attendant to ascertain the progress of dilatation. The bladder must be carefully watched, and if it becomes distended the catheter passed, as a full bladder retards the labor by nearly or completely checking the uterine contractions. As the completion of this stage is approached the pains become more frequent and severe and their character changes. Each contraction is accompanied by a straining or bearing-down effort, and as a rule the membranes will rupture spontaneously about this time and be followed by a gush of fluid. If the patient has not yet lain down, she should be placed upon the bed and a vaginal examination now made. If the cervix is found to be fully dilated, her wrapper must be removed and everything gotten in readiness for the birth.

How is the second stage of labor to be managed?

The first thing to observe when the second or propulsive stage has been reached is whether or not the membranes are still intact. If so, with the fingers in the vagina we wait until a contraction takes place. The membranes now become tense, and by simply pressing against them with the finger-nail they will usually rupture. If not, by gently scratching them with the end of a stylet or hair-pin, thoroughly carbolyzed, the liquor amnii is evacuated. Hot and cold water, ice, the ligature, scissors, and ergot should now be in readiness for use. The position of

the patient during the second stage must be left to her selection. In England the established position is upon the left side, with the buttocks close to and parallel with the edge of the bed, while upon the Continent and in this country most obstetricians prefer delivering the woman in the dorsal position. If the choice is left to the physician, this latter position should be selected, as the exposure of the patient is less and the management of the labor much easier for him. During the pains of this stage of labor the patient must be encouraged to "bear down" or strain; and this is greatly facilitated by her grasping firmly the sides of the bed or a long towel tied to its foot. When the head has reached the perineum these voluntary efforts on the part of the mother should cease as far as possible.

If the stage be at all prolonged, it is advisable that the physician auscult the abdomen occasionally to see if the foetal heart-sounds are still distinct and regular. When the perineum has become completely distended, and just as the head is to pass over it, the patient must be urged to open her mouth and cry out, as this lessens the strong force driving the head against the perineal body, and many times prevents a tear which otherwise would occur. As soon as the head is born the fingers are passed down to the neck and the cord felt for. If it be found coiled about the neck, by making gentle traction upon the placental end it may be slipped over the head, or, when loosened in this way, it may glide down over the shoulders as the body is born. It occasionally happens that it is coiled about the neck two or three times. In these cases it should be ligated in two places and cut between the ligatures. If this becomes necessary, delivery must be hastened by pressure upon the fundus of the uterus and gentle traction upon the child. The head is now supported by the hand, while the eyes and face of the child are carefully cleaned with a soft wet cloth, and the nurse or assistant places a hand upon the fundus of the uterus and compresses it firmly as the contractions occur and the body of the child is born. This hand should not be removed until the accoucheur can take the uterus to manage for the third stage. The head being born and restitution having taken place, the shoulders and body usually follow during the next uterine contraction. If the contractions are weak and ineffectual, and the child's life is endangered by the delay, gentle traction may be made upon the head or with the fingers in the axillæ; but these measures should never be resorted to unless deemed absolutely necessary, and must always be accompanied by a gentle rubbing of the fundus of the uterus. As soon as the child is born the mouth should be carefully wiped out, and after it has cried and the heart-action becomes regular the cord is tied. One ligature, preferably of linen or cotton tape, so that it will not cut through the cord and into the umbilical vessels, is placed about three inches from the umbilicus, and a second an inch nearer. The cord is then cut between the ligatures, and the end carefully wiped to see that no bleeding is taking place. If a large amount of Wharton's jelly is present, it is often advisable to strip the cord. This hastens desiccation, and may be done in

the following manner: After one ligature has been applied, the cord is grasped firmly at the umbilicus between the thumb and index finger. It is then cut on the umbilical side of the ligature, and with the fingers and thumb of the other hand the gelatinous matter is gently squeezed out. A second ligature is now applied near the end.

Describe the management of the third stage of labor.

As soon as the child has begun breathing naturally, the face cleansed, and the cord cut, it should be carefully wrapped up in a soft blanket and removed from the bed to a warm place. A towel is now wrung out of some antiseptic solution and placed over the vulva, and the uterus taken from the nurse by the physician. If at all soft or relaxed, gentle rubbing causes the uterus to contract. Within a few minutes regular contractions will occur at short intervals, and the placenta may be spontaneously expressed. If after waiting fifteen or twenty minutes this is not the case, Credé's method of expression may be resorted to. This consists in applying gentle friction over the fundus, and during a contraction making firm downward pressure, with the fingers extending over its posterior and the thumb its anterior surface.

As the placenta escapes from the vulva a dish is held in readiness to receive it, with the blood and clots, and as it passes over the perineum it should be taken in the hand to prevent dragging on the membranes. By making gentle traction upon the placenta in a backward direction the membranes will slip out without tearing. Twisting them into a rope during their withdrawal is not desirable, as it may be, and often is, the means of causing them to tear. As a matter of routine a drachm of the fluid extract of ergot should now be given, as it secures a firm and persistent contraction of the uterus and lessens the dangers of post-partum hemorrhage. However, *never* give ergot until the placenta and membranes have been carefully examined and found to be intact.

How should the mother now be cared for?

A warm douche of a solution of bichloride of mercury, 1 : 5000 or 1 : 8000, is given, the vulva carefully cleansed with the same solution, and, if the perineum be lacerated, one or more sutures ought to be introduced at once. If it is found to be intact, a pad is applied over the vulva and the soiled bedding removed. These vulvar pads may be made of bleached gauze or cheese-cloth padded with absorbent cotton, and before their application should be wrung out of a weak bichloride solution (1 : 5000). After keeping the hand over the uterus half an hour, or longer if the organ has any tendency to relax, the binder may be applied. This is best made of coarse, unbleached muslin, and should extend from the ensiform cartilage to the middle of the thighs. It is fastened by pinning down the centre and taking gores on the sides to prevent it from slipping out of position. Its advantages, when properly adjusted are numerous and evident. It gives a comfortable support to the abdominal walls, which are naturally very lax after childbirth, and

restores the intra-abdominal pressure. By its constant and even pressure upon the uterus it promotes the involution of this organ, which is so important for a rapid and complete convalescence, and it prevents relaxation and resulting hemorrhage. It is also said to preserve and restore the figure of the patient. If at the end of an hour the pulse is not over 90, the hemorrhage is not free, and the patient is resting comfortably, she may be left with safety, but should be visited again in the course of six or eight hours.

What attention must be given to the child after the mother has been cared for?

Now that the mother is attended to, look at the child. See that it is breathing naturally, and then examine the cord and see whether or not it is bleeding. The entire body and scalp of the infant should be smeared with sweet oil or vaseline to facilitate the removal of the vernix caseosa, and the cord dressed. The latter may be done in this way: In the centre of a piece of soft linen cut a hole and slip the cord through, wrap a little absorbent cotton about it, and fold the cloth so that the cord will be against the child's abdomen. Now wrap the infant again in a soft blanket and place it in a crib with hot-water bottles or bags about it, and leave it a few hours before bathing. At the end of six or eight hours it may be washed in warm water with castile soap and a soft sponge. Do not place the child in a bath. The cord after each bath is to be dressed in the manner described above, excepting that it is well to dust a mildly antiseptic powder upon it. A powder of 1 part of iodoform and 2 parts of bismuth is efficient, and not irritating. By this treatment desiccation is hastened, and there is much less danger of septic peritonitis from absorption through the umbilicus. After the bath some inert powder is dusted in the axillæ, the folds about the neck, and buttocks, and the child dressed.

A soft flannel binder or bellyband is first applied. This extends from the nipples to midway between the umbilicus and symphysis, and must be put on smoothly and loosely, pinning it with safety-pins. Over this a soft shirt is worn, then a flannel petticoat and a long dress. The diaper is preferably made of old cotton cloth, it being soft and non-irritating. In about twelve hours the child should be put to the breast and allowed to nurse for five or six minutes from each. However, the mother has little or no milk for twenty-four or forty-eight hours, and until the end of this time no regularity need be observed in the nursing.

ANÆSTHESIA, ANALGESIA.

When would you use chloral during labor? how much would you give? and what are the dangers connected with its administration?

Chloral is only of value during the first stage, and here, when used in suitable cases and properly given, it is a drug of unquestionable utility.

Where the pains come at frequent intervals and are severe, but have little effect on the progress of the labor, and where the os is thin and rigid and the patient nervous and exhausted, chloral is indicated. It is frequently given by the rectum suspended in mucilage or milk and the yolk of an egg. A dose of 30 grains may be given, and repeated in three-quarters of an hour if the desired effect is not obtained. By the mouth gr. x well diluted may be given every twenty minutes for three doses, and after waiting an hour the dose may be once repeated.

The great danger in the use of chloral is to the heart. Being a decided cardiac depressant, it is absolutely contraindicated in all cases where organic affections of this organ exist.

What effect has chloral on a patient in labor?

It quiets nervous excitability, and produces a drowsiness, if not sleep, between the pains. It lengthens the interval between the uterine contractions, and makes the latter stronger and more regular. Above all, it seems to soften the os and promote its dilatation.

When and how should chloroform be given during labor?

In the second stage only, and, only in exceptional cases, not until the presenting part has nearly or quite reached the perineum. A convenient method of administration is to fold a towel or napkin six or eight inches square, and upon it place about a drachm of chloroform. Holding it with the first two fingers on the moistened surface and the thumb on the opposite side, the backs of the former are allowed to rest upon the bridge of the patient's nose. In this way fully 90 per cent. of air is inhaled with each inspiration, and no part of the towel comes in contact with the face of the woman. At the beginning of a pain inhalation is commenced, and should cease as soon as the contraction stops. Surgical anæsthesia should not be obtained with chloroform.

What are the dangers arising from the use of chloroform?

It acts upon the motor ganglia of the heart, sometimes producing sudden death. It also acts upon the respiratory centre just as ether does, but to a less marked degree. It sometimes excites rather than quiets the patient, and its administration has to be stopped on this account. It diminishes the contractile power of the uterus, and thus increases the danger of hemorrhage.

What advantages has it over ether as an anæsthetic?

It is more pleasant to inhale, and as a rule does not produce any nausea or vomiting. Its effects are much more quickly obtained, and are more transient, passing away very soon after inhalation has ceased. Its vapor is not inflammable, as is that of ether; and this is one very strong point in its favor, as most confinements occur during the night, when artificial light is required. It is also true that pregnant women in labor do enjoy a certain, though not by any means absolute, immunity from the evil effects of the anæsthetic. The fact that severe pain exists gives to its

administration an element of safety. Furthermore, the woman is in a recumbent position, and is going through a perfectly physiological process, instead of being run down by disease, as surgical patients, to whom chloroform is given, often are. Its slow, gradual, and intermittent administration is a strong element of safety, and, above all, *there is but one well-authenticated case of death on record where chloroform was administered by a practitioner of medicine during labor; and in this case no autopsy was held.*

When is ether used?

Ether is by some practitioners always used in preference to chloroform to allay the severe suffering during the pains; however, its more general use is during operations, when complete anæsthesia is desired.

Two more drugs have been used to some extent for producing anæsthesia during labor. These are bromide of ethyl and cocaine—the former by inhalation, the latter in solution or ointment as a local application to the cervix, vagina, or vulva. Little success has accompanied the use of either—the former, on account of dangers arising from its use, and the latter, because the seat of the pain is not reached by local application.

THE PERINEUM.

What are the causes of perineal lacerations? and in what percentage of labors does laceration occur?

A pelvis in which the subpubic angle is too acute; posterior positions of the cranium, failing to rotate; excessively large head; rapid delivery of the head with the forceps, and failure to remove the blades at the proper time; birth of the head in breech labors, where the delivery must be rapid and the perineum has not had time to stretch; inexperience on the part of the physician,—may all be causes of perineal lacerations. Then there are some perinea which will always tear, no matter how carefully the labor may be managed and how favorable the presentation. This is observed in some thick, tense, and often cedematous perinea, which seem to possess no elasticity and begin to tear immediately the head presses upon them. Occasionally eczematous and other skin affections of the parts about the vulva and rectum render the tissues hard and brittle and favor lacerations. Statistics vary widely as to the percentage of perineal lacerations, but average in primiparæ from 18 to 28 per cent. and in multiparæ a little less than 4 per cent. It is estimated that about one-third of these must tear, no matter how managed.

Describe the different degrees of perineal lacerations.

(1) Incomplete lacerations are those in which the perineum is torn to the sphincter ani. Accompanying this external laceration there is more or less tearing of the vaginal mucous membrane, and it occasionally happens that this extends up the posterior vaginal wall nearly to the fornix.

It is generally confined to one side of the posterior column of the vagina, but may occur on both sides.

(2) Complete lacerations are those in which the perineum is completely divided, the sphincter torn apart, and perhaps the laceration may extend for some considerable distance up the wall of the rectum. In these cases the vaginal wall is invariably badly lacerated.

Describe the management of the perineum after the head has descended upon it.

1st. *In Dorsal Deliveries.*—The objects sought for are threefold: First and most important, is to retard the progress of the head, so that the perineum may have time to become fully dilated before its birth. Second, strive to get complete flexion of the head, so that its shortest diameters may pass through the vulva. Third, during its birth relax the perineum as far as possible.

These are accomplished in the following manner: When the perineum has begun to bulge outward during a contraction of the uterus, crowd the chloroform. Do not seek to obtain anæsthesia to the surgical degree, but only sufficient to prevent the strong expulsive efforts of the mother. Introduce the first two fingers of the right hand into the rectum and apply the thumb against the descending head. With these two fingers make pressure in two directions on the frontal region of the skull—upward and anteriorly. The former increases the flexion; the latter crowds the occiput forward and tightly under the pubic arch. During a contraction make direct pressure upon the head with the thumb, to prevent its too rapid descent. Then with the finger and thumb of the left hand crowd back the anterior portions of the labia until the occipital protuberance is felt to have emerged from under the symphysis. When this has taken place, wait for the pain to subside; then with the fingers of the right hand slowly extend the head, at the same time making gentle pressure downward and toward the median line with the thumb and two fingers of the left hand, which, being now at liberty, are placed near the posterior termination of the labia majora. This tends to relax the perineum. Do not allow the head to be born during a uterine contraction if it be possible to hold it back.

2d. *In the Side Delivery.*—Have the buttocks near the edge of the bed, with thighs and legs well flexed. Place a folded blanket or pillow between the knees to separate them, so as to allow room for manipulations with the left hand, which is placed around the thigh and rests upon the child's head. The other hand may rest upon this, and during a pain pressure with both is made, so that the descent is as slow as the operator may desire. Chloroform is freely administered as in other deliveries, and the anterior commissure of the vulva is crowded back; but as extension is about to occur the relaxation may be accomplished by pushing the perineum forward with the finger and thumb of the right hand placed along its sides.

EPISIOTOMY.

What is episiotomy?

Episiotomy consists in making lateral incisions on each side of the vulva to relieve the tension and prevent spontaneous lacerations in the median line. The incisions are made somewhat anterior to the central raphe, and should be made with blunt scissors during a uterine contraction. To be of advantage they must be one-half to three-quarters of an inch in length. After confinement a suture is introduced and union readily takes place.

Is episiotomy ever indicated?

It occasionally happens that a case is met with where laceration seems unavoidable. For example, before the perineum has distended nearly enough to allow of the passage of the head the fourchette is seen to tear and the skin covering the perineal body to become tense, and perhaps separate for a short distance midway between the posterior commissure and the anus. In such a case the operation is perfectly justifiable. But it so rarely happens that cases are seen where it can be positively asserted that a tear must take place that this procedure is, as a routine, to be discouraged.

Should perineal lacerations be repaired immediately?

They should in every instance where at all extensive. The internal lacerations of the vaginal mucous membrane should be united by small catgut sutures, and for the deep external sutures silkworm gut, silk, or very heavy catgut may be used. The former is preferable, as it can be made sterile so easily and is convenient to carry.

THE PUERPERAL STATE.

What is the puerperal state? Describe the general condition of the mother at its beginning.

The puerperal state comprises the period beginning with the completion of the third stage of labor and terminating with the recovery of the patient (Hirst). Soon after the completion of labor there may be a so-called post-partum chill. This is usually of short duration and of no importance. It is probably nervous in origin and due to the exhaustion following labor. The pulse, which has been accelerated during labor, falls soon after, many times considerably below normal, even to 50 or lower. For a time the temperature is somewhat elevated, especially if the labor has been difficult or prolonged. However, within twenty-four hours it should fall to normal or nearly so, and remain there throughout convalescence. There is a general feeling of comfort and well-being and a desire to rest, if not sleep.

Describe the changes occurring in the uterus during the puerperal state.

Immediately after confinement the uterus is firmly contracted, and

may be felt about midway between the symphysis and umbilicus. As a rule, however, it soon relaxes slightly, some clots come from within its cavity, and twelve or fifteen hours after the delivery its fundus lies on a level with or above the umbilicus. But now the process of involution begins. A fatty degeneration and absorption of the muscular fibres and cells and a growth of new cells occur, so that there is a constant loss in the weight and size of the organ. By the end of six weeks or two months, when this involution is complete, the uterus weighs but slightly more than in its nulliparous condition, while immediately after labor its weight is about $2\frac{1}{2}$ pounds. Involution is promoted by giving, for a couple of weeks, small doses of ergot (m_{xxv}–m_{xxx} of the fluid extract, *t. i. d.*). During this process a new decidua is being formed within its cavity. The superficial layer is detached and expelled with the placenta and membranes, leaving only fragments behind, which are adherent to the uterus. From these the new membrane is formed, and is complete by the fifth week. Large thrombi form in the uterine sinuses and gradually become organized. A shrinking occurs and a slow obliteration, but it is not until four or five months after labor that this process is complete. The cervix rapidly regains nearly its normal size, though never its virgin shape. The external os is almost invariably torn, and remains patulous for a considerable time.

What are after-pains? How caused and treated?

After-pains are simply pains due to uterine contraction. They are caused by the efforts nature is making to decrease the size of the uterus and express the foreign bodies in the form of blood-clots which it contains. They are almost invariably found in multiparæ, though occasionally met with in primiparæ where the uterus has been over-distended by twins or hydramnion. If care is taken to express all clots and secure firm contraction after labor, in many cases they will be avoided. A mixture containing

Morphine acetate,	gr. $\frac{1}{4}$ j;
Spts. Mindererus,	ʒij;
Fl. ext. of digitalis,	m _j ,

given every three or four hours, is highly recommended to relieve them.

Describe the lochia.

It is a discharge from the uterus, lasting from two to four weeks after delivery. Abundant at first and of a bright-red color, it gradually decreases in amount and assumes a paler and eventually a white hue. For the first three or four days, on account of the blood mingled with it, it remains red and is called "lochia rubra." From this time until the eighth or tenth day it is of a very pale-red color, and has received the name "lochia alba." It is estimated that during a normal puerperium the

entire lochial discharge amounts to about 3 or $3\frac{1}{2}$ pounds. A slight odor may occasionally be observed in the discharge, but if thorough cleanliness and antisepsis is observed it never becomes marked.

What can you say in regard to the care of the bowels and bladder during the puerperium?

From two causes it frequently happens that during the first few days there is retention of urine. In some cases it is of purely neurotic origin, and may be readily relieved by applying cloths wrung out of warm water over the suprapubic region. In others it is due to a partial and temporary paralysis of the neck of the bladder or to severe contusions and œdema about the urethra and meatus. In these cases it will be necessary to use the catheter. For this purpose a soft, flexible rubber catheter should be employed, and the strictest cleanliness and asepsis observed in its introduction. It should be passed every six or eight hours, and always by sight and not by touch.

On the second or third day after confinement the bowels, if they have not moved, should be relieved by some gentle laxative. If the patient can take it, nothing is better than a dose of castor oil. There is always a marked tendency to constipation, which may be combated by small doses of cascara sagrada, mild mineral waters, laxative pills, or enemas of soapsuds or glycerin.

What care should be given the breasts during this period?

Usually in about forty-eight hours milk is found in the breasts. From this time on the child should be nursed regularly. About the third or fourth day it frequently happens that the breasts become full, tense, and somewhat painful, and there is especial pain in the axillæ: added to this there is a general feeling of discomfort and a slight rise of temperature, perhaps to 100° or $100\frac{1}{2}^{\circ}$ F. If the nipples are not eroded or fissured, and if no areas of induration appear, this condition need cause no anxiety. It is simply due to a marked activity of the glands, and lasts only a day or two. From the time the milk appears the breasts must be properly supported either by a binder or in slings. The nipples are to be carefully washed both before and after the child has nursed. For this purpose nothing is more cleanly than a solution of boracic acid. Avoid all pressure over small areas of the breasts, for there is no more easy way of setting up a mastitis.

What should be the diet of a puerperal woman?

During the first twenty-four or forty-eight hours the diet should consist only of the most easily digested articles of food. Milk, mutton or chicken broth, beef tea, milk toast, and a little bread may be allowed. The patient should receive some nourishment every three or four hours if awake. After the second day any digestible foods may be given.

Avoid all pastry, cakes, fresh vegetables, rich desserts, fruits, and sweets while in bed. At the end of a couple of weeks she may resume her usual diet, taking care only to avoid such food as would be likely to cause indigestion.

How frequently should the vulvar dressing be changed? and when may a post-partum woman be allowed to sit up?

During the first twenty-four or forty-eight hours the lochial discharge is rather profuse, so that every three or four hours a clean new dressing ought to be applied, taking care to carefully cleanse the vulva and surrounding parts with a warm solution of bichloride of mercury, 1 : 5000. After this, and up to the eighth or tenth day, four times in the twenty-four hours is quite sufficient. From day to day, by examining the abdomen, the size of the uterus can be appreciated. Until the fundus has disappeared below the symphysis, or at least can be felt on a level with the pubis, the patient should be kept in bed.

How may a diagnosis of the puerperal state be made?

By the size of the breasts and presence in them of milk or colostrum; by the flabby, wrinkled condition of the abdominal walls and the large size of the uterus; by the open and perhaps lacerated cervix; the character and amount of the lochial discharge; the large and relaxed vagina and abrasions about the vulva, or perhaps perineal laceration.

CARE OF THE INFANT.

Describe the care of the infant the first twenty-four hours of its existence.

For a few hours keep it well wrapped up in blankets and warm. Then bathe and dress it, and allow it to nurse for a few minutes from each breast. After this, if it cries and worries, it may be given a little warm water or warm peppermint-water with a medicine-dropper. It should not be allowed to nurse, as it only worries the mother and the child gets no nourishment.

How frequently should it be allowed to nurse after the first day?

Every two or two and a half hours, beginning at seven in the morning when the mother awakens, and continuing until nine in the evening. During the night, if restless or wakeful, it may be allowed to nurse once or twice. Above all, observe regularity in its feeding, and even though the child be asleep it should be awakened when the hour for its nursing comes around. Always keep it loosely though warmly clad, and in such a position that bright light does not strike the eyes.

CHAPTER V.

UNNATURAL LABORS.

PERSISTENT OCCIPITO-POSTERIOR POSITIONS.

State the causes which may operate to prevent anterior rotation of the occiput in posterior positions of the vertex.

Incomplete flexion of the head, so that the chin does not come in contact with the sternum, an excessively large head, or a normal head and a justo-minor pelvis, and a very small head and roomy pelvis. (The last class of cases is usually seen in premature labors, and as a rule, though rotation does not occur, the labor is no more difficult than it would be were the occiput anterior.)

Describe the management in this class of cases.

If complete flexion can be secured, these cases will usually rotate, so our one object in their management is to promote flexion by upward pressure on the sinciput during uterine contractions. At the same time an attempt may be made to aid rotation of the forehead backward by pressing in that direction on the side which looks toward the pubes. Many cases of this kind occur where the rotation takes place very late in the labor, and not until the head is well down upon or bulging the perineum. If the labor is much prolonged, the energies of the mother are becoming exhausted, and no rotation or descent is taking place, the forceps should be applied and the head drawn down to the perineum. The blades should then be removed, and labor allowed to terminate by the natural forces. Usually at this time rotation occurs, and the case is practically the same as an anterior position. If the occiput is born posteriorly, the perineum is invariably badly lacerated.

FACE PRESENTATIONS.

Give the frequency and cause of face presentations.

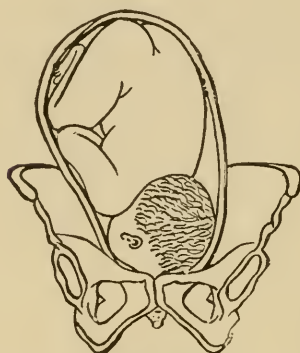
The frequency of presentation of the face varies, according to different authors, from 1 in 150 to 1 in 450 labors, the average being about 1 to 200. The transformation from vertex to face usually takes place during the last few weeks of pregnancy, and may be due to one of a number of different causes. Uterine obliquity (marked); dolicho-cephalic child; tumors of the neck and thorax; excessive amount of liquor amnii and a small child; rapid evacuation of the liquor amnii during labor; hitching of the occiput at the brim of the pelvis, and a lack of proper flexion as the head enters the pelvis,—have all been given as causes.

Name the positions of the face.

The *first position* corresponds to the first position of the vertex. In

it the chin points to the right sacro-iliac symphysis and the forehead anteriorly and to the left—R. M. P. (right mento-posterior, Fig. 17).

FIG. 17.



R.M.P.

FIG. 18.

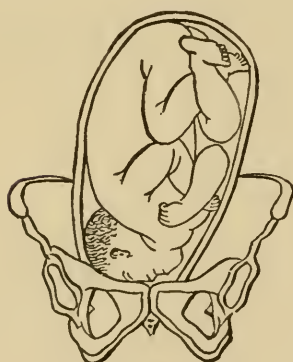


L.M.P.

The *second position* corresponds to the second vertex position. The chin points to the left sacro-iliac symphysis, the forehead anteriorly and to the right—L. M. P. (left mento-posterior, Fig. 18).

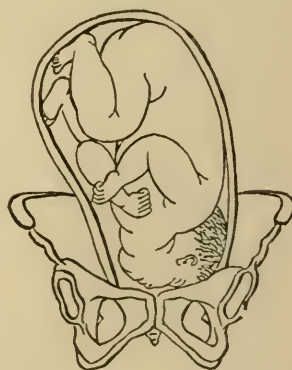
The *third position* corresponds to the third vertex position. In it the

FIG. 19.



L.M.A.

FIG. 20.



R.M.A.

chin is directed anteriorly and to the left side, the forehead posteriorly and to the right sacro-iliac symphysis—L. M. A. (left mento-anterior, Fig. 19).

The *fourth position* corresponds to the fourth vertex position. The

chin is directed anteriorly and toward the right side of the mother, the forehead posteriorly and to the left sacro-iliac symphysis—R. M. A. (right mento-anterior, Fig. 20).

How would you diagnose a face presentation before the membranes have ruptured?

It is often extremely difficult to make a diagnosis before this time. Palpation in the first two positions may lead us to suspect a face, but by it a positive diagnosis cannot be made. After feeling the head, the hands, being passed over the abdomen and considerable pressure made, suddenly sink into the deep sulcus lying between the occiput and shoulders. On vaginal examination the membranes during a pain are more prominent and project farther through the cervix. The hard forehead is felt, and when the membranes are relaxed it is at times possible to appreciate the nose and orbital cavities.

How would you diagnose a face presentation after rupture of the membranes?

The only time a mistake can now be made in the diagnosis is when the labor has been prolonged. Under these circumstances the face becomes very much swollen and oedematous, and no landmarks can be appreciated. Ordinarily, the forehead is felt with the frontal, and perhaps the coronal, sutures. Then by passing the fingers down the frontal suture, the root of the nose, the orbits, the superciliary ridges, the nostrils, and the mouth may all be easily recognized. By putting the finger into the mouth the alveolar ridges prove conclusively the presentation, and make the differentiation from a breech possible. Extreme care must be observed not to press roughly against the face and thus injure the features.

Give the mechanism in face presentation.

In face presentation the mechanism of delivery is nearly the same as in the vertex, only that we must consider the forehead in *face* to take the place of the occiput in *vertex* presentations. Thus we have, as in vertex cases, five periods, constituting the mechanism: 1st, extension; 2d, descent and engagement; 3d, internal rotation; 4th, descent and flexion; 5th, restitution and external rotation.

By the first movement, or that of extension, the occiput is pressed backward and the chin descends lower in the pelvis than the forehead. In this position engagement occurs and descent begins. It is now that the rotation takes place just as in vertex cases, and for exactly the same reasons. By the time the process is completed the face has reached the floor of the pelvis, with the chin anterior and the occiput lying in the hollow of the sacrum. Then begins the fourth movement, or that of flexion. The chin emerges under the pubic arch, and there becomes fixed, allowing the forehead, face, and occiput to successively sweep over

the perineum. The last movement of restitution now occurs, exactly as in normal vertex positions, and the mechanism for the shoulders and body is just the same as in vertex cases.

Does the face always rotate anteriorly ?

It does not, and in such cases, if the labor be at term, the child of normal size, and the pelvis not unusually large, operative interference of some kind is invariably necessary. In these cases, which, fortunately, are extremely rare, the crown of the head is jammed tightly behind the pubes and the chin lies in the hollow of the sacrum. This places the long occipito-mental diameter in relation with the antero-posterior diameter of the pelvic outlet; and, bearing in mind the fact that the latter is but 5 inches, while the former is $5\frac{1}{4}$ inches, and that little or no shortening of this diameter can occur, it will be readily seen how impossible delivery is unless the head is compressed.

What can you say of the prognosis and treatment of face presentations ?

The dangers to the child are much greater than in vertex cases, even though internal rotation occurs. The labor is apt to be prolonged, and the child is subjected to an extreme amount of pressure, which many times causes cerebral congestion or hemorrhage; so that the mortality, when anterior rotation of the chin occurs, is between 8 and 14 per cent. When this does not occur, it is almost 100 per cent., as most of these cases require craniotomy. To the mother the prognosis is but slightly graver than in vertex cases.

Treatment.—Various methods of treatment have been adopted in face presentations, which in some instances have met with success, in others failure, so that few authors attempt to lay down any fixed rules by which all cases should be treated.

If the diagnosis is made before the cervix is completely dilated and before the presenting part has entered the pelvis, we may resort to one of two procedures—convert it into a vertex or do a podalic version. (Unless the chin lie anteriorly, in which case, if we fail in changing to a vertex, the *labor should be left to nature.*)

A very clear and concise description of the former treatment has been given by Dr. Partridge in a paper read before the New York State Medical Society a few years ago. In it he says: "The conditions especially favorable to the operation are an os nearly or quite dilated; a face not engaged in, or at least capable of being readily lifted from, the pelvic brim; an unruptured bag of waters; a capacious vagina. In a majority of labors a stage is reached when there are present these conditions." His method of procedure is to "give chloroform for relaxing the structures of the parturient canal, to quiet the movements of the patient, and to obviate pain." The hand is then introduced into the vagina, and the fingers passed up through the cervix into the uterus. The palms are passed over the occiput and traction made in a downward direction. "Flexion

may be greatly aided by external manipulation." Continuing, he says that "in some instances in which the membranes are unruptured at the beginning of the operation they remain unbroken at its completion, showing how simple the operation can be." After flexion has been obtained the case must be carefully watched, and any tendency to a return to the face presentation should be checked by applying the forceps and engaging the head. Version, then, is never justifiable when the above can be done, and should only be resorted to after all attempts to engage the head in a flexed position have failed, and then *only* when the *chin points posteriorly*. If the case is not seen until the face has entered the pelvis, but one plan of treatment offers itself—namely, that which will secure anterior rotation of the chin if possible. This will almost always take place if marked extension be present; therefore we should aid this by upward pressure with two fingers on the forehead during each uterine contraction. If this prove unsuccessful, an attempt may be made to secure rotation by placing the fingers in the mouth and drawing the chin forward during a pain.

Another method of accomplishing the same result has proven successful in the hands of some accoucheurs. This consists in introducing one blade of the forceps so as to press upon the posterior cheek. All three methods may be attempted. If failure is encountered, and the chin continues to point posteriorly, the only resource left is to perform craniotomy.

PELVIC PRESENTATIONS.

How are breech presentations divided ?

Into complete or full and incomplete. In the first variety the thighs are flexed upon the pelvis, the legs upon the thighs, the feet are crossed, and are in contact with the buttocks. There are several varieties of incomplete breech presentations: (1) Those in which the thighs are flexed on the pelvis, but the legs are extended at the knee, so that the feet lie by the child's face and the buttocks alone present. (2) Cases are met with where the thighs are but slightly flexed and the legs completely so. These constitute knee presentations. (3) The lower limbs are completely extended: these are the so-called footling presentations. (4) Very rarely it happens that one leg is flexed, the other remaining completely extended. The mechanism is exactly the same, no matter how the pelvic extremity presents.

State the frequency and causes of pelvic presentations.

At full term about 1 labor out of every 60 is breech. In premature labors pelvic presentations are much more frequent, averaging nearly 1 in 20 labors.

One of the most frequent causes of pelvic presentations is premature delivery. Among other causes may be mentioned an excessive amount

of liquor amnii, a very large uterus, a small child, a hydrocephalic child, placenta prævia, and all forms of pelvic deformities.

How many positions are met with in pelvic presentations?

Four.

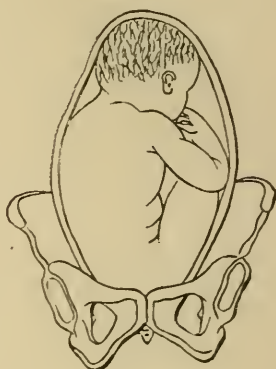
1st. *Left Sacro-anterior* (L. S. A.).—The back of the child points

FIG. 21.



L.S.A.

FIG. 22.



R.S.A.

anteriorly and to the left side of the mother, and the long diameter of the hips lies in the left oblique of the pelvis (Fig. 21).

FIG. 23.



R.S.P.

FIG. 24.



L.S.P.

2d. *Right Sacro-anterior* (R. S. A.).—The dorsum of the child points anteriorly and to the right side of the mother, and the long diameter of the hips lies in the right oblique of the pelvis (Fig. 22).

3d. *Right Sacro-posterior* (R. S. P.).—In this position the back of the child points posteriorly and to the right side of the mother, and the long diameter of the hips lies in the right oblique of the pelvis (Fig. 23).

4th. *Left Sacro-posterior* (L. S. P.).—The back of the child points posteriorly and to the left side of the mother, and the long diameter of the hips lies in the left oblique of the pelvis (Fig. 24).

Describe the mechanism of delivery in the four pelvic presentations.

Unless the pelvis be normal and the child at full term, there will be no mechanism in pelvic presentations. In the first position we have first a moulding of the breech, occurring with the descent. This is really an act of adaptation. Now, after engagement has taken place, internal rotation of the trunk begins. This is due to exactly the same causes as in vertex presentations, and when completed the left hip lies under the symphysis pubis and the long diameter of the buttocks is in conformity with the antero-posterior diameter of the outlet of the pelvis. The next movement is one of lateral flexion. By this the posterior (right buttock) is born over the perineum; then, the descent continuing, the left buttock is disengaged from under the symphysis, and the limbs, trunk, elbows, and shoulders are born in succession. External rotation of the trunk and internal rotation of the head take place as the body is expressed, and if complete flexion of the head has been maintained, by the time the trunk is born the occiput has rotated from left to right and lies under the symphysis pubis. Here it remains fixed, and in succession the following diameters appear: the occipito-mental, the suboccipito-frontal, and the suboccipito-bregmatic. Last of all, the occiput is born.

In the second position the movements are exactly the same, excepting that they take place in opposite directions. The internal rotation brings the right hip under the symphysis, and the occiput rotates from right to left, instead of from left to right.

In the third position the mechanism is the same, only the rotation must be more extensive to bring the right hip under the symphysis. So also must be the rotation of the occiput, and this takes place just as in the third vertex position.

From the foregoing the mechanism of the fourth pelvic position will be readily understood.

What are the causes of infant mortality in pelvic presentations?

1st. *Compression of the Cord*.—This may occur to a serious degree even before the head has reached the pelvic brim, which is the time at which funic compression is usually considered dangerous. The cord is caught between the trunk of the child and the wall of the pelvis. Even though this does not happen as soon as the head enters the superior strait, the foetal circulation through the cord is interfered with, if not stopped entirely.

2d. *Extension of the Head*.—This a grave complication, as delivery of an extended head is invariably retarded—often until death of the fœtus occurs.

3d. *Extension of the Arms*.—This also causes delay just at the point when rapid delivery is necessary.

4th. *Inspiratory Efforts before the Birth of the Head*.—By these mucus, blood, and liquor amnii are drawn into the respiratory passages, preventing any possibility of resuscitating the infant. Dubois gives the average of 1 death to 11 deliveries.

Is the maternal prognosis more grave in breech than in vertex presentations?

It is not. Although the first stage is likely to be prolonged and tedious, the second is usually much more rapid than in vertex labors, so that the entire labor is not unusually long.

How may a pelvic presentation be diagnosed before labor has begun?

Palpation.—As described on page 110, we find a broad mass in the iliac fossæ, nearly immovable and resting higher up, out of the pelvis. Small parts of the fœtus may be appreciated in the lower segment of the uterus, and above in the fundus the head is found. If cephalic ballotement is obtained, the diagnosis of the extremity is certain. Auscultation reveals the maximum intensity of the fœtal heart-sounds on a level with or above the umbilicus. On vaginal examination, as a rule, nothing can be felt. The breech lies high up and away from the examining finger, though occasionally an extremity can be found. On the slightest pressure this will glide away from the finger as though drawn up by the fœtus. Such a sensation would make the diagnosis assured.

How may a pelvic presentation be diagnosed after labor has begun?

On palpating and auscultating the same condition of affairs is found as described above. If the membranes be still intact when a vaginal examination is made, little will be discovered, unless the os is dilated, excepting a peculiar feel to the bag of waters. It is longer and more conical. Now, if we examine when the cervix is more dilated and the membranes ruptured, the diagnosis, as a rule, is very easily made. The finger first comes in contact with a soft, fleshy mass. No sutures or fontanelles are felt, and on passing backward a groove is reached, and beyond a mass similar to the part with which our finger first came in contact is discerned. Following the groove, first in one direction and then in the other, we feel on one side a small osseous point, the coccyx. Pushing farther upward, the spinous processes of the sacrum may be distinguished. In the other direction we find the anus, and if the finger can be introduced this is readily recognized by the contraction of the sphincter and the presence

of meconium, which covers the finger. In front of the anus the genital organs are found. If the feet be pressed against the buttocks, they may be felt and the character of the presentation readily determined. The position is recognized by the position of the sacrum.

From what must the breech be differentiated ?

The only presentation with which a breech may be confounded is a face, and then only when the labor has been much prolonged and the parts very œdematous. The mouth is differentiated from the anus by the alveolar ridges in the former and the sphincteric action in the latter. Nothing resembling the sacral spines can be felt in a face, and nothing resembling the nostrils in a breech.

How would you recognize the foot or knee ?

The only part the former might be confounded with is the hand. Bearing in mind these points, the mistake will never be made. The toes are shorter than the fingers and placed in a straight line. The thumb can be brought in contact, across the palm of the hand, with any of the fingers ; the great toe cannot. The thumb and first finger may be considerably separated ; the toes cannot. Nothing resembling the malleoli or the heel can be found on the hand. Last of all, the hand lies on a straight line with the arm ; the foot is at right angles to the leg. The foot felt (right or left) is determined by finding the great toe, the internal border, and the heel, and by imagining one's own foot in the same position. The knee is appreciated as a smooth, rounded mass with two tuberosities and a deep depression behind.

Describe the management of pelvic presentations.

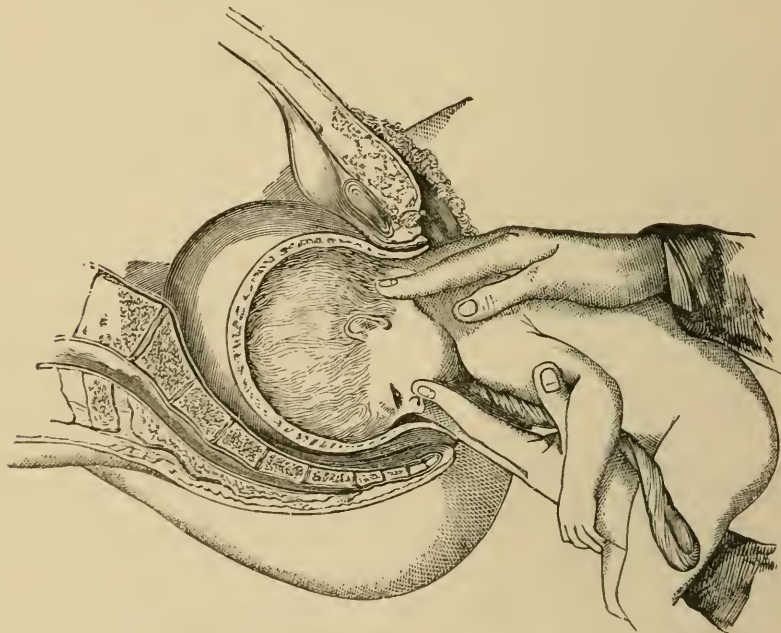
In managing a pelvic presentation we seek, first, to keep the membranes intact until they reach the perineum if possible, that dilation of the cervix may be complete ; second, to maintain flexion of the head ; third, to hasten delivery after the trunk is born ; fourth, to prevent extension of the arms and head by improper interference.

When labor has begun, always remain with the patient and keep her very quiet, that no movement on her part may cause premature rupture of the membranes. If rupture has not taken place when the bag of waters has reached the outlet of the pelvis, it should be artificially ruptured. The foot now appears at the vulva, and *from this time on* the hand of an assistant—preferably, the accoucheur if necessary—should keep up constant pressure over the fundus uteri. As the feet descend, followed by the buttocks, support them with the hand, but do not make any traction. As soon as the genital organs have emerged from the vulva, pass the hand along the child's abdomen, secure the cord, and draw a loop downward. If pulsations are present, allow nature to take its course, raising the body of the child from the bed with each contrac-

tion, and keeping up firm pressure over the fundus. At the same time encourage the mother to bear down, as her efforts will very naturally hasten the delivery.

The arms and shoulders are then expelled, and the child lies with its abdomen pointing toward the bed. The cord will now be found pulseless, and the life of the child at this point depends entirely upon the rapidity of the delivery of the head. Raise the body well up toward the pubes and abdomen of the mother with the right hand, and with the first and second fingers of the left reach up between the symphysis pubes and neck of the child until the occiput is felt, and push downward. If delivery is not readily accomplished, traction must be made on the trunk. A short trial at this method will soon show whether or not delivery may be completed. If failure should meet our efforts, there are two more methods which may be tried. One consists in giving the body into the hands of an assistant, and with the first two fingers of the

FIG. 25.



Delivery of the Head in Breech Cases.

left hand introduced over the face of the child downward pressure is made on the two malar bones, aided by the pressure on the occiput (Fig. 25); or the forceps may be used. They should always be at hand in breech deliveries, and are applied beneath the abdomen. However,

bear in mind that the delivery *must* be rapid to secure a living child, and the first method described, if properly done, will almost invariably be crowned with success unless the head is extended.

DIFFICULT BREECH PRESENTATIONS.

What are the most serious complications met with in breech presentations?

The failure of the head to rotate in the sacro-posterior positions, extension of the head, and extension of the arms.

State the management of a sacro-posterior position where internal rotation does not occur.

As a rule, this is observed either where a disproportion between the maternal pelvis and foetal head is present, or where the head becomes extended through improper management or interference. In either case our efforts are in *two* directions: first, to secure and maintain good flexion; and second, to assist rotation by proper manipulations.

The body of the child being supported by the hand of an assistant, upward pressure is made on the occiput by the first two fingers of the right hand. With the fingers of the other hand pressure is made upon the anterior temple during a pain. By these means rotation, as a rule, will take place. In case it does not and the head descends to the pelvic outlet with the occiput lying posteriorly, if flexion be present traction should be made in a backward direction, that the neck may act as the point of rotation and the face emerge first under the pubes. However, if the head be extended the chin will become fixed back of the symphysis, and our traction must be made in a directly opposite direction, allowing the occiput and back of the head to first emerge over the perineum. In case extraction cannot be accomplished before the death of the foetus has occurred and the possibility of resuscitation passed, craniotomy may be resorted to as a justifiable and proper means of saving the maternal soft parts from serious injury.

How are extended arms to be treated?

The arms must be made to pass downward over the chest of the child, but, as direct traction would result in fracturing the delicate bones, we pass two fingers over the shoulder and down toward the elbow as far as possible; then make gentle pressure. The arm will slip by the face, and by passing the fingers farther along the forearm is made to follow in the same direction. When both are extended the posterior is the first to be liberated, as more room for manipulation is found in this part of the pelvis.

What is an impacted breech presentation? Describe its management.

A breech becomes impacted in the pelvis when a marked disproportion

exists between it and the pelvis, even though the attitude of the foetus be normal. In such cases normal progress of the labor may usually be obtained by drawing down one of the legs, and thus breaking up the impaction. In other words, substitute a half for a full breech. However, when reference is made to an impacted breech we usually understand it to be one in which the limbs, though flexed at the thighs, are extended at the knees. This forms, as it were, a wedge, the small part of which is the breech and the large part the head and feet of the child (Fig. 26).

FIG. 26.



Pelvic Presentation with Legs Extended.

dilated and the condition recognized. In the natural breech the practitioner can always feel a foot, heel, or toe, but in these cases he cannot; and if not, he will, by abdominal palpation, discover the feet lying in the fundus of the uterus by the child's head. If the back of the foetus is toward the right side of the mother, the right hand is introduced into the uterus, a foot seized and drawn down. If the back lies toward the left side of the mother, the left hand of the accoucheur is used. The labor is now allowed to progress naturally.

For carrying out the above procedures chloroform or ether to the surgical degree should be given.

Other causes arise where the impaction is found too late in the labor to allow of the hands being passed by the breech and up into the uterus. Two methods for treating these cases are used by different practitioners: one is to apply the forceps to the breech; this is not advisable. The other is to make traction with an instrument, or with a piece of cloth or the fingers passed over the groin. The best of these three is either the finger or a soft folded cloth.

PRESENTATIONS OF THE TRUNK.

What are the positions of the foetus in transverse presentations? and which is the most frequent?

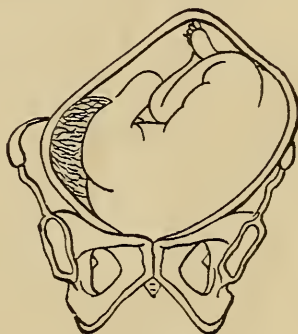
The term "transverse presentation" is somewhat misleading, inasmuch as the child never lies directly transversely, but always in an

FIG. 27.



L. D. A.

FIG. 28.



R. D. A.

oblique diameter of the uterus midway between the vertical and the transverse: therefore, the shoulder, elbow, or arm are the parts found presenting. There are four positions—namely, (1) left dorso-anterior, in

FIG 29.



L. D. P.

FIG. 30.



R. D. P.

which the head lies in the left iliac fossa and the back points anteriorly (Fig. 27); (2) right dorso-anterior, in which the head lies in the right iliac fossa with the back of the child anterior (Fig. 28); (3) left abdom-

ino-anterior or dorso-posterior, which corresponds to the one first mentioned, except that the abdomen lies anteriorly and the back toward the mother's back (Fig. 29); (4) right abdomino-anterior, in which the head lies in the right iliac fossa and the abdomen points anteriorly (Fig. 30). The most frequent are the two first mentioned, and of these the left dorso-anterior is the one most commonly met with.

How frequently do presentations to the trunk occur?

According to some, they are found as often as 1 in 125, while others give their frequency as 1 in 250 or 300.

State the causes of transverse or shoulder presentations.

Multiparity; a too pronounced uterine obliquity; pelvic deformities, especially a jutting forward of the sacrum; excess of liquor amnii; prematurity; deformities of the foetal head; placenta prævia, or a low implantation of the placenta, which prevents the head from lying in the lower uterine segment,—are among the many causes given. Then, also, accidents may occur, which have a decided influence in determining this form of presentation. Falls and irregular pressure over the abdomen may materially aid in determining a shoulder presentation where a tendency toward this exists in the way of uterine obliquity and lax abdominal walls.

How would you diagnose a trunk presentation before the membranes have ruptured?

Inspection shows an unsymmetrical appearance of the uterine tumor, with a bulging, rounded mass in one iliac fossa. This is especially apparent in thin women who have lax abdominal walls. *Palpation* reveals the absence of any mass occupying the inferior uterine segment, but shows the presence of such a mass in one iliac fossa and on the opposite side of the abdomen; and, lying much lower down than would the breech in vertex or the vertex in breech presentations, is found another mass. The smooth, hard, even surface of the back or the irregular abdominal surface of the foetus can be appreciated as lying in an oblique diameter of the uterus. *Auscultation* reveals the greatest intensity of the foetal heart-sounds considerably higher up than is the case when the vertex presents. By *vaginal* examination nothing but a flabby vaginal canal and empty lower uterine segment can be felt.

How would you diagnose a trunk presentation after rupture of the membranes?

Inspection, palpation, and auscultation are productive of the same results. In making a vaginal examination, unless some part of the arm or hand are prolapsed, we feel nothing. As a positive diagnosis must be made as early as possible, chloroform or ether should be given, and the hand gradually introduced, cone-shaped, into the vagina. The two fingers now being passed through the cervix, the smooth, rounded promi-

nences of the shoulder with its sharp acromion process may be felt. Passing around it, the axilla is recognized, and then the ribs. When the latter are felt the diagnosis is positive. The exact position of the child is ascertained by finding in which iliac fossa the head lies. If this has not been determined by palpation, we will know as soon as the axilla is felt, since it always points toward the feet. We determine the position of the back through the vaginal examination by feeling the spine of the scapula either in front or posteriorly. In case the elbow lies at the os, it is readily recognized by the sharply projecting olecranon process lying between the two smaller prominences, the condyles. The method of differentiating the hand from the foot has already been given.

Finding a hand projecting from the vulva, how would you determine whether it was the right or left hand?

Imagine one's own hand placed in the same position as that of the foetus, and we know immediately which it is. Or take hold of it as though to shake hands: if the two palms and thumbs lie in apposition, it must be the right hand; if not, it is the left. The position of the body of the child can also be recognized by the hand, provided we feel sure it is supinated, as its back must point to the back of the child and its palm to the abdomen.

Upon what does the prognosis of this form of presentation depend?

Upon the time when the position is recognized, upon its management, the cause of the presentation, and the facility with which version can be done. For the mother it is exceedingly bad when a deformed pelvis has been the determining cause or when labor has been much prolonged before treatment is undertaken. Churchill estimates a loss of 1 out of 9 mothers in 235 cases. About 60 per cent. of the children are lost.

How may these cases terminate?

There can be no mechanism to them, but there are two ways possible for them to terminate—namely, by “spontaneous version” or by “spontaneous evolution.”

What is spontaneous version?

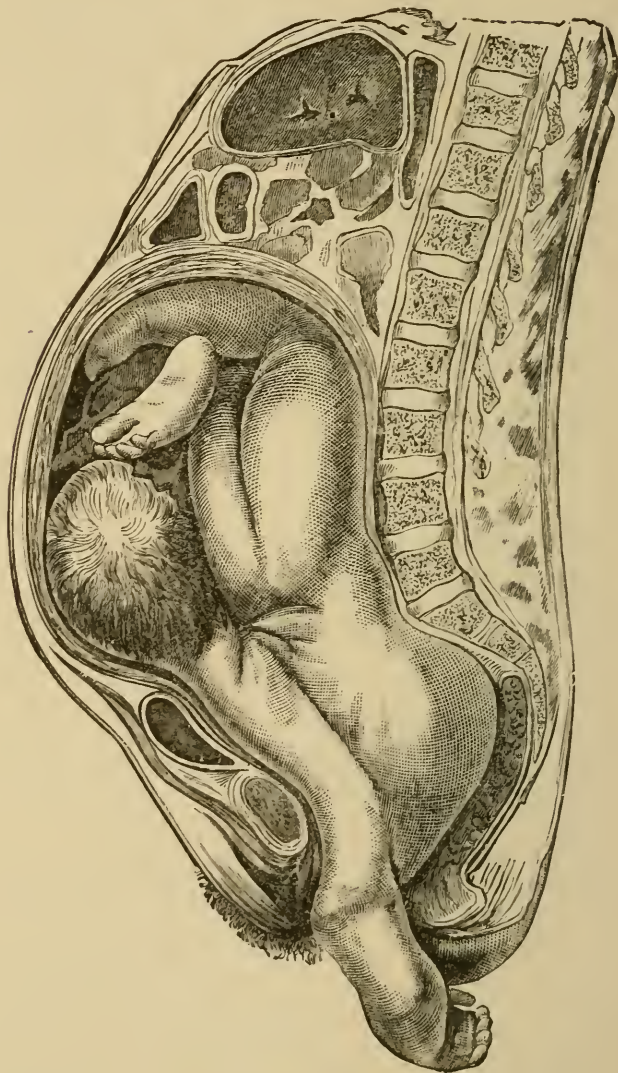
This can only occur with a living foetus, and may take place during the latter weeks of pregnancy or after labor has begun. It is the substituting of the vertex or breech, over the cervix, for the shoulder. The probable cause of this very fortunate but rare occurrence is irregular uterine contraction, and this termination is rendered wellnigh impossible after the membranes have ruptured and the liquor amnii has been evacuated.

What is “spontaneous evolution,” and when does it occur?

It is the birth of the child folded as it were upon itself (Fig. 31). It can only take place during labor and with a dead foetus, unless under very favorable conditions—namely, an exceedingly roomy pelvis and

small child or a premature infant. Under these circumstances living fœtuses have been born by spontaneous evolution. Two varieties have

FIG. 31.



Spontaneous Evolution.

been observed: in one the head is born first; in the other, the breech. The former can take place only with very premature children. In the

latter the child is crowded tightly down within the pelvis, the presenting shoulder lying behind and the head above the pubes. With the head and shoulders fixed here the body rotates, so that the breech is crowded out of the pelvis over the perineum. The head is the last part of the child to be expelled.

Describe the management of shoulder presentations if discerned before labor has begun.

These cases should be treated by doing a cephalic version. After the head has been pushed down over the cervix and the breech up in the fundus, a pad is to be applied over the abdomen by the side of the head, and, to hold this in place, an abdominal binder. By these means we prevent the slipping back of the head to its former position in one iliac fossa.

Describe the management of shoulder presentations after labor has begun.

In these cases one of three methods of version must be resorted to—external cephalic version if possible; failing in this, the bimanual method should be tried, but cases are found where neither will succeed, and in these the internal version must be performed. Failing in all these, two resources remain: the destruction of the foetus (embryotomy) and a Cæsarean section. The obstetric operations above spoken of, versions, embryotomy, and Cæsarean section, will be described farther on.

COMPLEX PRESENTATIONS.

How would you treat a case where the hand was found presenting with the head?

It occasionally happens that the hand is drawn back by the child itself. If this does not occur, we attempt to gently force it back during the intervals between the pains. The head will now usually descend sufficiently to prevent its again slipping down. However, if it tends to return to the abnormal position, the forceps must be applied and the head engaged, care being taken not to catch the arm with one of the blades. If the foot is found presenting with the head, the same plan of management may be pursued. This, however, is of very infrequent occurrence.

State the management of a case where the arm lies across the back of the neck.

The diagnosis of these cases is very difficult, and, unless by exclusion, can be made only after an anæsthetic has been administered and the hand introduced into the vagina. The obstruction to the descent of the head occurs so high up that by ordinary vaginal examination it cannot be felt. The condition being recognized, the patient may be placed under the influence of chloroform and an attempt made to replace the hand and forearm. This, however, is not likely to prove successful, and podalic version must be resorted to.

What treatment must be pursued when a hand and foot are found presenting?

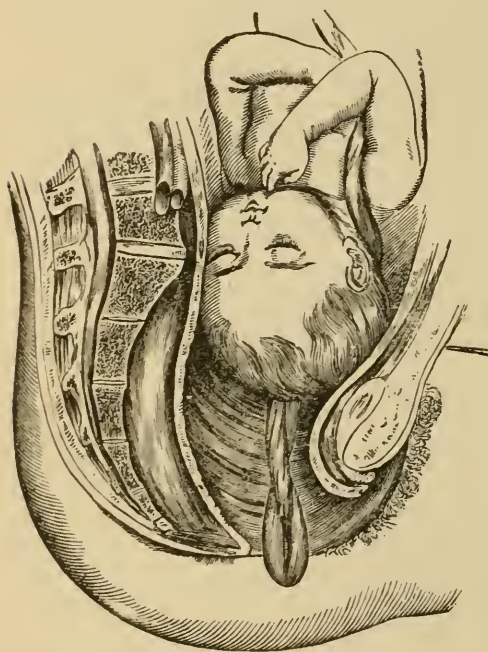
Podalic version. As traction is made on the foot, upward pressure upon the shoulder causes the hand to recede, and a half breech is substituted for the hand and foot.

PROLAPSE OF THE FUNIS.

What is prolapse of the umbilical cord? and with what presentation does it most frequently occur?

It is the falling down of a loop of the cord beyond the presenting part of the fœtus (Fig. 32). This loop becomes compressed between the

FIG. 32.



Prolapse of the Funis.

presenting part and the walls of the pelvis, the circulation is interfered with or checked, and asphyxia and death of the fœtus result. It most frequently occurs with breech or transverse presentations.

State the causes and frequency of this complication.

Any condition which prevents the presenting part of the fœtus from accurately fitting the pelvic brim is conducive to prolapse of the funis. Thus we find it most commonly in contracted pelvises and with abnormal presentations. Other important causes are an excessive amount of liquor amnii and early rupture of the membranes, especially if the patient be in an upright position; also an unusually long cord and low attachments of the placenta. The frequency is variously estimated by different

authors as 1 case in 100 to 1 in 300 labors.

Under what circumstances is the prognosis to the child most favorable?

In cases in which the prolapse occurs in a multipara with a small child and a breech or transverse presentation. At best, less than 50 per cent. of the children are saved, and this mortality is much increased in vertex

cases occurring in primiparæ, especially if the prolapse occurs with the head high up in the pelvis and the child large and at term.

How would you diagnose and treat a case of prolapse of the funis?

After the rupture of the membrane the diagnosis is attended with no difficulties. However, if it occurs before the liquor amnii has drained away, it is oftentimes difficult to determine the condition unless the pulsations can be felt through the membranes. The reason of this is obvious. Being light and soft, the moment the part is touched with the finger it immediately recedes and lies beyond our reach. If the condition is found before the membranes are ruptured, the woman should be kept quietly on her back with the hips well elevated, for as long as the membranes remain intact little or no pressure can be exerted upon the cord, at least not until the os is completely dilated. As soon as dilatation is complete two or three fingers should be introduced into the vagina, and a very small puncture of the membrane made, that the escape of the liquor amnii may be slow and the great danger of a large loop of the cord being washed out avoided. Upward pressure upon the prolapsed loop should be tried as soon as the liquor amnii has drained away, and an attempt be made to crowd the head into the pelvis by pressure over the abdomen. If this succeeds and the cord remains in its normal position, and if we find the child's condition good, as will be shown by the foetal heart-sounds, the labor may be allowed to terminate by the natural forces. Such a favorable termination, however, though the most desirable, cannot always be looked for, and recourse to more active methods of treatment must be had. There are four procedures which may be attempted, no one of which is adapted to every case: (1) postural treatment; (2) artificial reposition by instruments; (3) the use of the forceps; (4) version in vertex cases.

The method of procedure in the first form of treatment is to place the patient in the knee-elbow position. This elevates the hips, and naturally the cervix; at the same time it lowers the fundus of the uterus; thus its anterior wall forms a smooth inclined plane down which the cord may pass. Before the rupture of the membranes this method will almost invariably be crowned with success, and it is only necessary to rupture them and allow the woman to carefully turn over upon the back. If the cord again slips down, the same manœuvre should be repeated, pressure being made upon the abdomen while in the knee-elbow position, that the head may be engaged and prevent the loop from again slipping down. After the escape of the liquor amnii this procedure is not so likely to prove successful. It may be tried, however, and often, if the head can be pushed up, the cord will slip back. The simplest instrument for accomplishing reposition, and at the same time one that is most likely to be at hand, is a gum-elastic catheter. This is prepared by passing the two ends of a narrow piece of tape through the end and drawing them down until they emerge at the eye of the catheter. Allow the loop (an

inch and a half or two inches) to project through the end. This is passed around the cord and slipped over the point of the catheter. Gently drawing down on the ends of the tape which emerge from the opening, the cord is firmly held in position and carried up beyond the head by pushing the whole arrangement upward. After the prolapsed portion is well up above the head the catheter alone is withdrawn. The use of the forceps is demanded when, with a roomy pelvis, the cord persists in relapsing after being replaced. They should be applied, and as traction is made the cord pushed upward. If after engaging the head the foetal heart shows that the circulation is not interfered with, they may be removed and the labor allowed to terminate naturally. If not, the head must be rapidly drawn through the pelvis. It is obvious that this method of rapid delivery should not be attempted unless the pelvis be amply large or the head very small. Version is applicable as a last resort or in cases in which the forceps are inadmissible on account of a small or primiparous pelvis.

ANOMALIES OF THE FORCES IN LABOR.

PROTRACTED LABOR.

State the causes of prolonged labor, and when does the delay occur.

Many pelvic deformities and inelasticity of the parturient canal, as well as tumors and foetal deformities, cause prolonged or protracted labors; but the term is used only in those cases in which the delay is due to a defectively acting uterus. Thus, its walls may be very thin, allowing only weak contractions or perhaps an entire absence of them. This is seen in women marrying too young, as the organ is not fully developed. A condition of uterine inertia is also frequently seen in multiparæ who have borne a large number of children. The organ is, as it were, worn out. Enfeebled constitution and long residence in tropical climates, by enfeebling the nervous powers, cause inertia. Mental conditions, excess of liquor amnii, and displacements of the uterus are also causes. The delay, as a rule, occurs in the second stage of labor. However, this is not always the case. A prolonged first stage, if the membranes remain intact, is of little consequence to either the mother or the child, though this is not so if the liquor amnii has drained away, as both the child and the uterus are exposed to constant and oftentimes injurious pressure.

State the dangers and symptoms of a prolonged labor.

To the child the dangers arise from the constant and prolonged compression of the head, as is shown by the gradual diminution in the frequency, strength, and regularity of the foetal heart. To the mother exhaustion comes, as it must with prolonged suffering of any kind. Injury to the soft structures occurs, resulting at times in sloughing and septic infections. The thin uterus, perhaps through interference, perhaps simply through a uterine contraction, ruptures, and death results.

Post-partum hemorrhage is of frequent occurrence in these cases, and as a rule is difficult to control.

Symptoms.—Labor perhaps progresses normally until the head has emerged from the os, and then the pains cease or become very infrequent, irregular, of short duration, and inexpulsive. The pulse, which has been 80 or 90 up to this time, rises to 110 or 120; the patient becomes irritable and very restless. Nausea, vomiting, and a coated tongue, accompanied by a rise of temperature to 100° or 101° F., now follow. The vagina is hot, dry, and extremely sensitive, and the secretions, which have been abundant, are entirely absent. Thirst is intense and a complete loss of appetite is present. If these symptoms are allowed to continue unrelieved, the vomiting becomes excessive; delirium occurs, the pulse becomes more rapid, and at last imperceptible; the temperature rises very high; the vagina becomes hotter and drier; and the patient dies with all the symptoms of complete exhaustion.

Describe the management of prolonged labors when delay occurs during the first stage.

As has been stated above, it is rare to meet with cases in which a delayed first stage requires interference; however, cases will arise where it becomes necessary to resort to treatment of some kind. If labor has been in progress some time, the os is tense and undilated, and the patient irritable, nervous, and wakeful, we should first see that the rectum is emptied by a warm-water or soapsuds enema. A prolonged vaginal douche of a solution of bichloride of mercury, 1 : 10,000, at a temperature of 112° to 116° F., will often alter materially the character and strength of the pains. If more rapid progress does not now occur, chloral hydrate, in gr. x-xv doses every fifteen or twenty minutes until thirty or forty-five grains are taken, will promote dilatation of the os and allow of some sleep between the uterine contractions. Or a hypodermic of Magendie's solution of morphine, m_vj to viij, may be given. After a few hours' sleep the patient will awaken refreshed, and labor will now be rapidly completed. As soon as the os is dilated sufficiently to allow of the introduction of the fingers, they should be passed up and swept around the lower segment of the uterus, carefully dissecting the membrane from its walls, as undue adhesion is frequently a cause of tardy or slow dilatation. Often much can be accomplished by the introduction of one or two fingers within the cervix, and in the interval between the pains, by gradually stretching it. If all methods meet with failure, recourse may be had to the use of Barnes' hydrostatic dilators. The smallest size is first introduced; after this is expressed, the second size, and so on until the largest has been used, waiting each time for the natural expression of one before the introduction of a second.

In cases where the inertia uteri is due to an over-distended organ from an excessive amount of liquor amnii, the fluid must be evacuated, and in

such cases the rupture of the membranes before the dilatation of the os is complete is perfectly justifiable.

Describe the management of prolonged labors when delay occurs during the second stage.

Dilatation of the os is complete, the head enters the pelvis, and here descent ceases. Our first step is to determine the cause of delay—whether it be a weakness of the uterine muscles or a disproportionate head. If the former be the cause, forceps may be used with great success and perfect safety. Often it will be only necessary to make traction a few times when the pains will return and labor be terminated normally. The second class of cases will be treated of under the head of *Obstructed Labor*.

There are several adjuncts to, or methods of, treating cases of prolonged labor.

The first is the use of oxytocic remedies, or those drugs which, given internally, increase the force of the uterine contractions. The drug which has attained the most widespread reputation as an oxytocic during labor is quinine. Playfair says: "It has no power in itself to excite uterine contractions, but simply acts as a general stimulant and promoter of vital energy and functional activity." It may be given in doses of gr. xv or xx every twenty minutes until gr. xl or xlv are taken, and often will materially promote the progress of the labor. Ergot has also been used to some extent in these cases, but is absolutely contraindicated. The contractions caused by it are not the regular uterine contractions of a pregnant uterus at term, but rather a constant tonic rigidity, which simply delays labor, and often causes the death of the fœtus from the excessive compression to which it is exposed. Strychnine has been used some of late, and with success. Electricity, especially the faradic current, has been used as a promoter of uterine contractions by some, but its utility is very questionable. If applied, the current should be given over each side of the uterus near the fundus. One other adjunct, occasionally resorted to, remains to be spoken of. This is the so-called manual expression. Its method of application is this: The palms of both hands are applied over the fundus of the uterus, and as soon as a pain begins firm pressure is made in a downward and backward direction. This is extremely painful to the mother, and is rarely attended with any success. Therefore it should not be resorted to excepting under rare circumstances—namely, a premature child and failure of the uterus to contract when the head is at the pelvic outlet.

PRECIPITATE LABORS.

What is a precipitate labor?

The so-called precipitate labor is one which takes place too rapidly. It is not of very frequent occurrence, and happens in this way: Just about when labor should begin the woman has one pain, and during the contraction

the child and placenta are born. This is the true precipitate labor, though we often designate those cases as such in which one expulsive pain, just as the cervix is almost completely dilated, causes the birth of the child; in other words, cases in which there is no appreciable second stage.

State the causes of, and dangers arising from, precipitate labors.

Some women are especially afflicted with this form of labor, and the cause is usually a large pelvis, lax parturient canal, non-resisting cervix, and an excessively strongly contracting uterus. The dangers to the child are obviously greater than to the mother. The fact that it may be born at any time and place exposes it to great risks, as well as the danger arising from its falling to the ground if the mother be standing, as is often the case. The dangers to the mother are hemorrhage from rapid delivery or the tearing away of the placenta from its uterine attachment; inversion of the uterus from the dragging on the cord and placenta; and perineal lacerations.

Is there any method of treating these cases?

If a woman is met with in whom this form of labor has once occurred, she should be kept quietly in the house during the two weeks preceding the expected time of labor. In those cases in which the rapidity occurs during the second stage, chloroform may be administered and the patient cautioned to refrain from all bearing-down efforts.

ANOMALIES OF THE SOFT PARTS IN LABOR.

OBSTRUCTED LABOR.

What conditions of the maternal soft parts may cause delayed or prolonged and tedious labors?

I. *Of the Uterus and Appendages.*—(1) Irregular ante-partum hour-glass contractions; (2) fibroid tumors; (3) ovarian tumors.

II. *Of the Os Uteri.*—(1) Rigidity or spasm of the os; (2) organic rigidity; (3) occlusion; (4) cancer; (5) catching of the anterior lip between the presenting parts and pubes.

III. *In the Vagina.*—(1) Atresia; (2) cicatrices; (3) cystocele; (4) rectocele; (5) rigid perineum; (6) accumulation of faecal matter in the rectum.

IV. *At the Outlet.*—(1) Œdema of the vulva; (2) thrombosis of the vulva.

What is the so-called hour-glass contraction of the uterus?

This extremely rare condition has been described as a constriction of the muscular fibres of the internal os uteri, which is so firm and persistent as to cause an almost insurmountable obstacle to the birth of the child. The administration of chloral in full doses is recommended, or complete anæsthesia under chloroform or ether may cause a muscular

relaxation which will permit of the introduction of the forceps and delivery in this way, or the doing of a podalic version. Failing in these, Cæsarean section must be done.

In what situation are uterine fibroids likely to cause the greatest obstacles to delivery? and what is the great danger of fibroids complicating pregnancy?

In the lower zone of the uterus or upon the cervix, as they then fill up the pelvic cavity or infringe upon it, and prevent the descent of the fœtus. The greatest danger arising from the presence of fibroid tumors is the frequency with which hemorrhage occurs after delivery in these cases. In cases in which the tumor is attached low down, by placing the patient in the knee-chest position it may occasionally be pushed up out of the pelvis, and thus allow of the descent of the head. At other times, when attached to the cervix, it may be possible to remove it by the *écraseur* before labor begins if discovered in time. In a majority of cases delivery by the Cæsarean section is the only possible method, and the mortality in cases operated upon for this complication has been very high.

What can you say in regard to the management of cases in which ovarian tumors complicate pregnancy?

If the tumor encroaches upon the pelvic cavity to a degree which interferes, to the slightest extent, with delivery, it should be punctured and the fluid withdrawn. If this be not possible, either craniotomy or the Cæsarean section must be done.

State the causes and treatment of spasm of the os uteri.

The rigidity is usually only in the os externum. It is frequently met with in women of a highly nervous temperament and in those cases where the liquor amnii is evacuated at the beginning of labor. A distended bladder or rectum also frequently causes this condition, and as soon as the catheter is passed or the rectum emptied dilatation proceeds normally. Again, we meet with cases where a thick os is the cause of the rigidity.

From what has already been said under the treatment of prolonged labors, the management of these cases is obvious. Hot vaginal douches and forcible dilatation with the fingers may both be used, but the remedy *par excellence* is chloral hydrate. Three most desirable effects are produced by the proper administration of this drug: First, nervous patients become quiet and sleep between the pains; secondly, the frequency of the contractions is decreased, and they become regular and stronger; thirdly, the os becomes soft and more dilatable. The best method of administration is by the rectum.

In what class of cases is organic rigidity of the os met with?

In multiparæ who have had extensive lacerations of the cervix with resulting cicatricial masses, and in those cases where a severe endome-

tritis or cervicitis has been the cause of the rigidity. As a rule, little or no treatment is required, although more rapid progress is made if frequent douching is resorted to.

What is the cause of occlusion of the os? and how is it treated?

It is usually the result of an active cervicitis occurring after impregnation has taken place. The exudation of the plastic material causes an agglutination of the margins of the os externum. Occasionally, as in the previously described cases, douches will relieve the condition. If not, the patient should be placed in Sims's position, a speculum introduced, and the cervix examined. The position of the os is apparent from a small depression found upon the cervix. With a bistoury two or three small, conical incisions are made at the depression. The finger should then be pushed through the cervix, that we may know the condition is relieved, and the labor allowed to progress normally if, as is usually the case, the dilatation progresses as it should.

Should pregnancy be allowed to continue if carcinoma of the cervix is present?

As soon as such a condition is recognized abortion or premature labor should be induced. All are agreed upon this. If labor begins before the condition is discovered, we should wait a short time to see if dilatation progresses to any extent; if not, the cervix is to be incised as already described. Now, if delivery does not occur, we may resort to one of two procedures: craniotomy if the os be sufficiently dilated, or Cæsarean section; and, as a rule, in any case the choice lies with the latter.

If the cervix is found tightly wedged between the pubes and the head of the child, how would you remove it? and what are the dangers if it is allowed to remain?

During an interval between the pains the anterior lip is taken between the fingers and thumb and squeezed. This will remove considerable serum from the oedematous portion, and during the following pain it can be carefully pushed back over the head. If this procedure does not succeed, the forceps must be applied and delivery hastened, for prolonged compression of this part results in sloughing and very probably sepsis.

Describe the treatment of those cases in which the obstruction occurs along the vaginal canal.

(1) *Atresia*.—This is a partial closure of the vagina. It may be congenital, and is present in the form of a band occluding a portion of the canal. As soon as the head presses against the constriction a nick is made with the knife or scissors, the fingers introduced, and the band torn. Imperforate hymen or thin vaginal septa when met with should be treated in the same way.

(2) *Cicatrices*.—Old and firm cicatrices may be found in the vagina as a result of injuries in former labors, from syphilis, or from severe fevers. Occasionally they may be dilated by the continuous use of Barnes' hy-

drostatic dilators before labor has begun. If not discovered until labor, as they are made tense by the descent of the head a slight nick should be made with the knife, and dilatation may be accomplished during the birth of the child. Cases of this kind have arisen where craniotomy has been necessary.

(3) *Cystocele*, or prolapse of the bladder and anterior vaginal wall, has given rise to an obstruction, but only in cases where the bladder has been allowed to become distended. As a rule, a soft, elastic male catheter can be passed with little difficulty, and after the withdrawal of the urine the relaxed anterior vaginal wall can easily be pushed beyond the descending head. If the catheter cannot be passed, a fine aspirator may be used to puncture the bladder and remove the urine.

A few rare cases are on record where with a cystocele a large calculus is present. If the condition is recognized during pregnancy—and this is likely to be the case—it should be removed: if not discovered until labor is well advanced, an attempt must be made to push it out of the pelvis by placing the woman in the knee-elbow position. Failing in this, a vesico-vaginal fistula must be made and the obstruction removed through the opening.

(4) *Rectocele* will never cause an obstruction of any moment unless the bowel be filled with hard faecal matter. Naturally, in such cases the condition is relieved as soon as the rectum has been emptied.

(5) *Rigidity of the Perineum* may be the result of cicatricial hardening after injury during previous labors, but is most often found in primiparæ in whom the pubic arch is narrow. This prevents the occiput from fitting snugly under the symphysis, and as a result rupture of the perineum is almost inevitable. When the perineal body begins to bulge, chloroform must be freely administered, and an attempt made to stretch it with the fingers. Episiotomy may be of benefit in these cases if properly done.

State the management of those cases where delay occurs from œdema of the vulva.

This condition, when found, is usually associated with albuminuria. As the head descends the œdema becomes more marked. By making numerous fine punctures with a needle very rapid diminution in size takes place.

Where does the effusion take place?

Generally in one or both labia. It may, however, extend to all the surrounding cellular tissue, even extending up to the abdomen. The strong "bearing-down" efforts of the mother as the head is about to pass the vulva, especially if a varicose condition of the veins in this region exists, is the deciding cause of injury.

Describe the symptoms and treatment.

Pain, tenderness, and swelling, associated with mild or severe constitutional symptoms depending upon the character and extent of the

effusion, constitute the signs by which a *diagnosis* is readily made. The pain is of a tearing character, very severe, and shooting down the thighs and up the back. The swelling appears as a hard mass at the site of the effusion, and is extremely sensitive to the slightest pressure.

The constitutional *symptoms* are those resulting from the loss of blood if rupture occurs externally and the hemorrhage be not readily checked. These cases may terminate by absorption if the amount of extravasated blood be small; or if rupture does not occur at the time of the accident, suppuration and sloughing of the tumor may result.

The *treatment* consists in the immediate application of ice over the seat of effusion. If the tumor is not large enough to prevent delivery, this should be hastened by the use of the forceps. If delivery is impossible, owing to the extent of the effusion, an incision should be made, the coagula removed, and the wound packed to prevent hemorrhage. It may even be necessary to use styptics or the actual cautery to accomplish this. If no difficulty occurs during the delivery or if the tumor appears afterward, the constant application of cold or an evaporating lotion will often rapidly promote absorption.* If suppuration occurs, of course the tumor must be opened and treated as an ordinary abscess.

ANOMALIES OF THE PELVIS IN LABOR.

MALFORMATIONS.

What is a malformation of the pelvis?

Whenever the pelvis varies from the normal type to such an extent as to render labor difficult or dangerous for the mother, the child, or both, it is said to be malformed. Deviations from the normal may exist in the form, structure, and dimensions of the pelvis or in the direction of its planes and axes. There are, accordingly, three principal varieties: pelvises that are too large, those that are too small, and those having an abnormal inclination (Charpentier).

State the causes of pelvic deformity.

(1) Arrest of development or growth, which causes a funnel-shaped, masculine, or justo-minor pelvis; (2) softness of the bones from disease (rickets and osteomalacia); (3) muscular contractions; (4) undue pressure at any point.

Describe the methods of examining and measuring a deformed pelvis.

If from the history anything can be elicited upon careful questioning that would lead you to suspect a pelvic deformity, a careful examination should be made at least three or four months before labor occurs.

* Alcohol,	℥ij;
Liq. plumbi subacetat.,	℥ij;
Aquæ,	q. s. ad Oj;
Sig. External use.	

Inspection, with the woman standing, should first be resorted to. This shows us her height, and at the same time, if the deformity be excessive, it is often visible. The condition of symmetry of the sides is noticed; the limbs, whether curved or straight, are observed. We then examine the spine for curvatures, and feel if the apex of the sacrum is pushed inward. We next take the external measurements, and for this purpose a pelvimeter (preferably Baudelocque's) or a pair of calipers is needed. After this has been done both vaginal and rectal examinations should be made—the former for the purpose of determining the most important of all diameters, the true conjugate; the latter for the purpose of exploration.

Give the points between which the external measurements are taken, and the average lengths of these measurements in a normal pelvis.

The measurements given are those which are considered of importance and are in general use:

From the anterior superior iliac spine of one side to the opposite	9 $\frac{3}{4}$ –10 $\frac{1}{2}$	inches.
Extreme divergence of the iliac crests, from	11–11 $\frac{1}{2}$	“
From centre of iliac crest to tuberosity of ischium	3.51	“
From centre of inferior border of symphysis to posterior iliac spine of one or the other side	6.60	“
From depression just above spine of last lumbar vertebra to middle of symphysis pubis (external conjugate) .	7.75–8	“

The first three may be taken with the woman lying on her back; the last two are taken on the side.

How is the internal diagonal or the true conjugate determined?

For the purpose of taking this most important measurement numerous instruments have been devised; but none are as satisfactory as the index and second fingers of the right hand. With the woman in the dorsal position these two fingers are introduced in an upward and backward direction until the sacro-vertebral angle is reached. If a deformity be present, this will not be difficult. The wrist is then elevated until the finger presses tightly upon the inferior border of the symphysis. The tip of the index finger of the left hand is now placed upon the right finger, just under the symphysis; they are then removed, and the distance from the tip of the second finger, which has been in contact with the sacro-vertebral angle, to the index of the left hand is measured. This gives us the sacro-subpubic diameter, from which the height of the pubic arch must be deducted. As a rule, this is about $\frac{2}{3}$ of an inch, which is to be subtracted from the measurement. However, with a broad symphysis it will be necessary to deduct $\frac{3}{4}$ of an inch. When no promontory can be felt the inference is that labor may take place at term, although pelvic deformity may be present, and still we are unable to feel this angle.

What other points should be determined in making the internal examination?

The curve of the pubic arch, which is of considerable importance in recognizing a "masculine" pelvis. Then by passing the fingers to either side we notice whether or not the same amount of space exists on each side of the sacrum. The curve of this bone must also be determined. In a rachitic pelvis it may be almost flat.

How may pelvic deformities be classified?

I. As those affecting the entire pelvis, { Justo-major,
Justo-minor.

II. Those affecting certain portions of the pelvis, under which are classified the deformities due to disease—rachitis, osteomalacia, hip disease, etc.

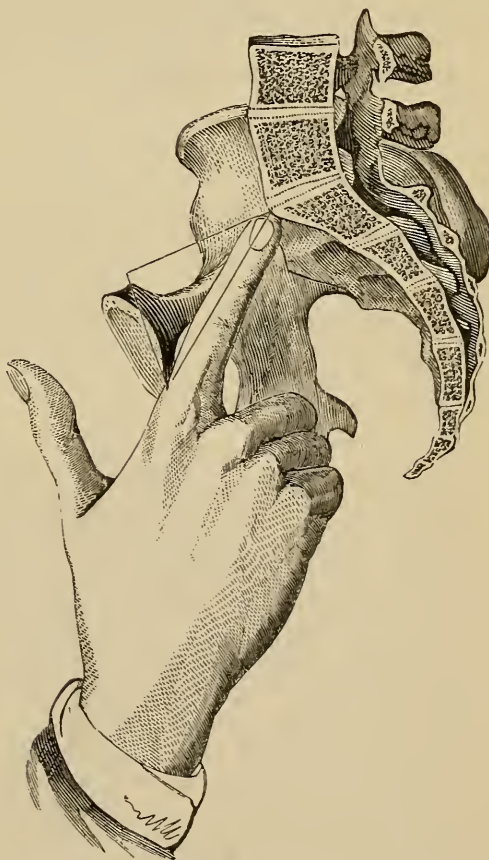
Describe the justo-major pelvis.

It is one in which all the diameters are equally enlarged. This form of pelvis, as a rule, is not diagnosed, as little if any difficulty during parturition occurs with this class of deformity. The labor is generally rapid, and may even be precipitate. There is likely to be some little increase in the irritability of the bladder and rectum during pregnancy, as the uterus descends farther into the true pelvis, and therefore more pressure is extended upon these parts.

In what class of people is the justo-minor pelvis most frequently found? Describe it.

Usually in dwarfs, although it is occasionally met with in well-developed women. It is caused by an arrest in growth, and in these cases all the diameters, though in proportion to one another, are shortened, sometimes

FIG. 33.



Method of Ascertaining the Internal Conjugate Diameter.

as much as an inch or more. Some authors speak of the infantile and undeveloped pelvis as differing from the justo-minor, but it seems as though they might both be classified with the above, as the diameters are in proportion, though all very markedly shortened.

The *diagnosis* of these cases is often not made until labor has begun, and if the amount of contraction be excessive the prognosis is naturally very grave.

What is the so-called masculine pelvis? and how is the deformity produced?

It is a deep pelvis, narrowed at its outlet by the close proximity of the ischial tuberosities, and hence called a funnel-shaped pelvis. The true conjugate may be normal or even increased in length. The pubic arch is considerably narrowed.

Which is the most common variety of contracted pelvis?

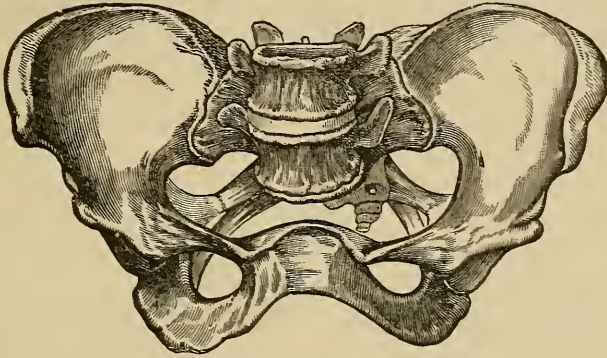
The flattened, or that in which the antero-posterior diameter at the brim is shortened. This deformity also occurs in rachitic pelves, but is frequently found unassociated with any disease of the bones. It is produced by a jutting forward and sliding down into the pelvis of the sacrum, and is found chiefly among the poorer classes, who in early life have carried heavy weights and done hard work before ossification of the pelvic bones has been completed. Though the conjugate diameter may be considerably narrowed, the transverse remains about normal; and from this fact the differential diagnosis between the simple flattened and the rachitic pelvis may be made, for in the latter, though the true conjugate be but slightly shortened, the transverse is very frequently increased in length.

Describe the rachitic pelvis.

This disease, rachitis, occurring early in life, and producing as it does a shortening and arrest in development of the bones, may give rise to the production of many different deformities, depending upon the influence of the external causes; for the affection in itself does not cause deformity, but renders the bones so flexible that they are easily moulded. The most common variety of rachitic pelvis is the flattened. When this is associated with a backward projection of the symphysis pubis and a bulging of the iliac bones, we have the "figure-of-eight" deformity (Fig. 34). In the flattened variety the sacrum is short, may be flat or even convex, is depressed, and tipped forward on its transverse axis. The measurement between the anterior superior iliac spines is longer than between the crests, just contrary to what it should be. The pubic arch is increased and the ischial tuberosities separated more than normal. The diameters at the outlet may be nearly normal or increased, and the whole pelvis is shallow. Add to the above a backward depression of the symphysis, and the "figure-of-eight" deformity is caused. Rachitic

women are, as a rule, undersized, with short, curved limbs and large, prominent hips. There is often present some spinal curvature, and they

FIG. 34.



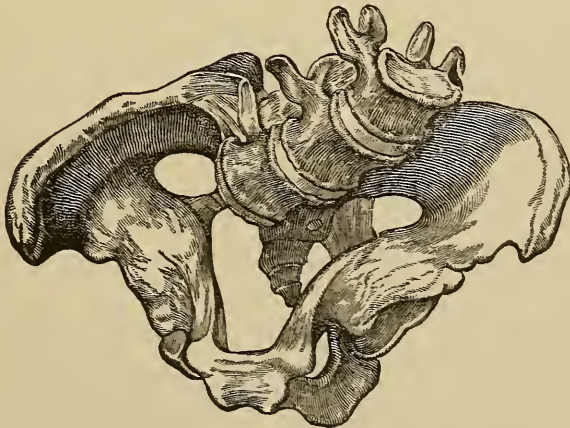
Rachitic Pelvis.

usually have a peculiar gait. The head is large and square and the forehead prominent.

Describe the osteomalacic pelvis.

Osteomalacia, being a disease of adult life and occurring after the complete development of the bones, the deformities caused by it differ

FIG. 35.



Osteomalacic Pelvis.

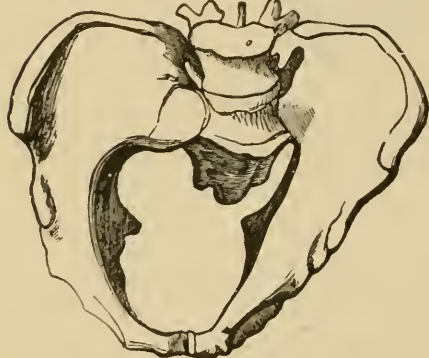
markedly from those due to rachitis. As the pelvic bones become softened the weight of the body above and the upward pressure of the

femora from below cause the deformity. The sacrum is depressed and becomes greatly curved, so that the lower and upper parts approach each other. At the same time, this allows the lumbar vertebræ to descend and form a projection, narrowing the superior strait. The cotyloid cavities are pushed upward and inward by the femora, and thus both oblique diameters are shortened. The tuberosities of the ischia approach each other, so that the transverse diameter at the outlet is diminished and the rami of the pubic bones come nearly in contact, leaving only a deep fissure in place of the arch (Fig. 35).

What is Nagele's pelvis?

This is an extremely rare variety of pelvic deformity which received its name from the complete description given of it by Nagele. It is the obliquely oval pelvis caused by an ankylosis of one of the sacro-iliac articulations and a lack of development of the half of the sacrum and the ilium on this side.

FIG. 36.



Nagele's Pelvis.

The sacrum is pushed over toward the ankylosed side, and the symphysis pubis drawn toward the opposite side. The oblique diameter, which is narrowed, is the one extending from the normal sacro-iliac synchondrosis (Fig. 36) to the ilio-pectineal eminence on the affected side.

Describe the transversely-contracted pelvis.

This is called the Roberts' pelvis, as it was first described by this writer. It is characterized by complete ankylosis of both the sacro-iliac articulations. The sacrum is also depressed in the pelvis, and the iliac bones flattened, so that there is a marked contraction both at the brim and outlet. It is an extremely rare deformity, but 8 cases having been recorded. In 6 the Cæsarean section was done; in 2, craniotomy.

Describe the pelvic deformity caused by scoliosis combined with rachitis.

Scoliosis alone rarely causes sufficient deformity to influence labor to any great extent. However, when complicating rickets, the extent and severity of the malformation are increased. The internal conjugate is shortened, as well as the oblique diameter at the outlet, and there is a transverse narrowing at the superior strait. There is also an inclination of the sacrum on the side of the lumbar scoliosis.

What is kyphosis? and what influence has it upon the pelvis?

It is the backward deviation of the vertebral column, and may be con-

fined to one region of the spine or involve nearly its whole length. It may be caused by rickets or be due to some local disease, such as caries. The curvature has a tendency to draw the upper part of the sacrum upward and backward, at the same time throwing forward its lower portion. The ischial tuberosities are brought nearer together and the pubic arch narrowed: the result is a deformity in which the antero-posterior diameter at the brim is lengthened, while that at the outlet, as well as the transverse, is shortened. If kyphosis exists with rickets, the deformity is even more marked and complex.

State the character of the deformity caused by spondylolisthesis and spondylozemia.

It is a narrowing at the brim, sometimes to a very great extent. The cause lies not in the pelvis itself, but by the sinking of the lower lumbar vertebræ into the pelvic cavity; therefore the narrowing is not of the true conjugate, which remains normal or possibly lengthened, but rather a blocking up of the pelvic inlet. The cause is either a dislocation forward of the vertebræ, owing perhaps to disease of the articulations, or the condition known as spondylozemia, in which the bodies of the lower lumbar vertebræ are destroyed by caries, allowing those above to sink downward and forward. The deformity is practically the same in either case, though the cause is very different.

What other conditions besides those enumerated above may cause deformed pelves?

(1) Luxations of either one or both femurs, whether congenital or acquired, may cause deformity. If but one side is affected, the half of the pelvis corresponding to the injury is less developed, and the pelvis is inclined to this side. The one oblique diameter is diminished. If dislocation be present on both sides, the iliac fossæ are pushed closer together, with the result of narrowing the transverse diameter of the cavity and increasing that of the outlet. With this deformity there is also an alteration in the planes of the pelvis.

(2) Tumors growing upon the bones and obstructing the cavity are of very rare occurrence.

Describe the methods of diagnosing a contracted pelvis.

In an equally-contracted pelvis the external measurements will usually show the condition of affairs, and by a digital examination a confirmation of the diagnosis is readily made. In the flattened pelvis we get the shortened internal conjugate, with perhaps measurements externally which are normal or nearly so. This is not the case in the rachitic pelvis, where the external measurements are apt to be considerably altered, as stated above. The transversely-contracted pelvis is determined by finding a shortening of the following diameters: between the crests and anterior superior spines of the ilia and between the ischiatic tuberosities. Cases due to or associated with spinal curvatures may be diagnosed by the history of the case and an examination of this condition. The posi-

tive diagnosis of the obliquely-contracted pelvis is made by letting fall two plumb-lines with the woman in the erect position—one from the symphysis pubis, and one from the sacral spines. In a normal pelvis these will fall in the same plane, while in one obliquely contracted they will deviate considerably.

What effects upon pregnancy and labor has a contracted pelvis?

Many times the direct cause of an abortion or miscarriage may be attributed to pelvic deformity. In case this does not occur and the pregnancy goes on to term, we find the fundus uteri higher than it should be at the period of the pregnancy, the abdominal walls hang forward, and abnormal presentations of the fœtus are much more apt to be present than is the case in normal pelvis, the greater frequency of face and shoulder presentations being especially marked. Some of the disorders of pregnancy are apt to be much aggravated by deformities. This is especially true of the dyspnœa and circulatory disturbances. In proportion to the amount of deformity are the risks to both mother and child, and the same may be said in regard to the alterations in the character of the labor. The pains are increased in intensity, depending upon the amount of resistance to be overcome. Labor is prolonged, and before its completion the character of the contractions usually changes, and from being severe, frequent, and regular they become infrequent and irregular, finally ceasing altogether. The os dilates very slowly, owing to the weak pains and the fact that in such cases early rupture of the membrane is likely to take place. Then also the cervix is apt to be thick, as the head has been prevented from making any pressure upon it by being held above the pelvic brim by the contraction.

What can you say of the prognosis to both mother and child in pelvic deformities?

In every case both the mother and child are exposed to more dangers than in delivery through a normal pelvis, but to make a correct prognosis in every case is out of the question. We must be very guarded in our prognosis, and governed entirely by the character and amount of the deformity, the presentation of the fœtus, and the period of pregnancy at which the case comes under observation. The greatest danger to the mother is from injury to the soft parts and occasionally to the pelvic joints. Then in those cases where operative interference becomes necessary the prognosis is graver. To the child the risks are from prolonged compression, injuries to the head, body, and limbs during birth, and the greater frequency with which prolapse of the funis occurs.

Describe the mechanism of delivery in vertex presentations.

(1) In generally and equally contracted pelvis the occiput is the first part of the head to engage. This becomes jammed down, so that the posterior fontanelle lies low in the pelvis, while the anterior is too high up to be within reach. The resistance now begins. If the contraction

is not too great, delivery will be accomplished in the usual way with a markedly moulded head or craniotomy may become necessary.

(2) In a flattened pelvis the head enters the pelvis with its biparietal diameter lying in the antero-posterior diameter of the brim: it becomes well flexed, so that the posterior fontanelle comes to lie almost in the centre of the pelvis. In this way descent occurs until the pelvic floor is reached, when internal rotation takes place and delivery is completed in the natural way. The above occurs only in those cases in which the contraction is not great and the antero-posterior diameter of the brim will allow of the engagement of the biparietal diameter of the foetal head. When the contraction is too great to allow of engagement, flexion does not occur above the pelvis, the bitemporal diameter engages, the head extends, and a brow or face presentation results.

(3) In the obliquely-contracted pelvis, if the amount of obliquity and the contraction be not too great, the head enters the pelvis in the longer oblique diameter, well flexed. Descent in this same diameter continues until the pelvic floor is reached, when the labor terminates in the natural way.

What can you say of the treatment in pelvic deformities?

The *treatment* resolves itself into one of five courses—forceps, version, the induction of premature labor, craniotomy or embryotomy, and the Cæsarean section. Unfortunately, no hard-and-fast rules applicable to every case can be made, and the course pursued must depend entirely upon the circumstances under which the case is seen. Most authors agree that a live child at full term cannot pass through a pelvis which measures less than 3 inches in the internal conjugate and 4 in the transverse, unless it be unusually small. If the case has been under observation from the beginning of pregnancy, and careful pelvic measurements be taken, and if the internal conjugate is not below $2\frac{1}{2}$ or $2\frac{3}{4}$ inches, we should try and carry the pregnancy to a period when a living child might be born, and then induce labor. Nature may complete the delivery after the pains have begun; and if not, delivery by the forceps is much more likely to give a living child, owing to the softness of the foetal bones and the readiness with which the head may be moulded. The following table, given by Kiwisch and copied from Playfair, may aid very materially in concluding the proper time at which labor should be induced:

				Inches.	Lines.				
When the sacro-pubic diameter is	2	and	6	or	7,	induce labor at the	30th	week.	
" " " "	2	"	8	"	9,	"	"	31st	"
" " " "	2	"	10	"	11,	"	"	32d	"
" " " "	3					"	"	33d	"
" " " "	3			1,		"	"	33d	"
" " " "	3	"	2	or	3,	"	"	34th	"
" " " "	3	"	4	"	5,	"	"	35th	"
" " " "	3	"	5	"	6,	"	"	36th	"

Barnes says—and his opinion is corroborated by many other authors—that either version or the forceps is applicable to the pelvis of 3.1 to 3.5 inches in the internal conjugate. Many objections have been raised to the use of the forceps, especially by the German obstetricians, some of which are the difficulties of introducing the blades and the danger of causing injury to the maternal structures. If the head is seized by the occiput and forehead, it is maintained that their compressive action will decrease its long diameter and increase the transverse. All these objections are certainly open to criticism.

Many believe it much easier to pull the after-coming head through a contracted brim than to draw the before-coming head down by the forceps, and therefore favor version. It is certainly true that version will succeed where the forceps have failed. In pelves between 3 and $3\frac{1}{4}$ inches version should be attempted. Between $3\frac{1}{4}$ and $3\frac{1}{2}$ either is perfectly justifiable. Above $3\frac{1}{2}$ the forceps should be tried, and if without success version may be done. In all pelves below 3 inches craniotomy or the Cæsarean section must be resorted to. The latter is certainly not indicated in pelves measuring more than $2\frac{3}{4}$ inches in the internal conjugate, unless the child be unusually large.

ANOMALIES OF THE FÆTUS.

PLURAL BIRTHS.

State the causes of dystocia in multiple pregnancies.

Inertia uteri, owing to the excessive distension of the organ, the presentation of parts of both children simultaneously, and the interlocking of the two heads in cases where one child presents by the vertex and the other by the breech.

Does the management of a normal twin labor differ from that of a single labor?

It does not. As soon as the first child is born and its cord tied and cut the child should be removed. Then we should wait a short time for the uterine contractions to recur. If they do not come on within a few minutes, the membranes surrounding the second fœtus ought to be ruptured and gentle friction made over the fundus. If this does not produce contractions, the forceps may be applied, provided the head has entered the pelvis, or a version may be done if this is not the case. Either will be comparatively easy, as the parturient canal has been well dilated by the birth of the first child.

How would you treat a case in which both heads were found presenting?

By introducing the hand in the vagina and the fingers into the uterus an attempt may be made to push one child up out of the way. The

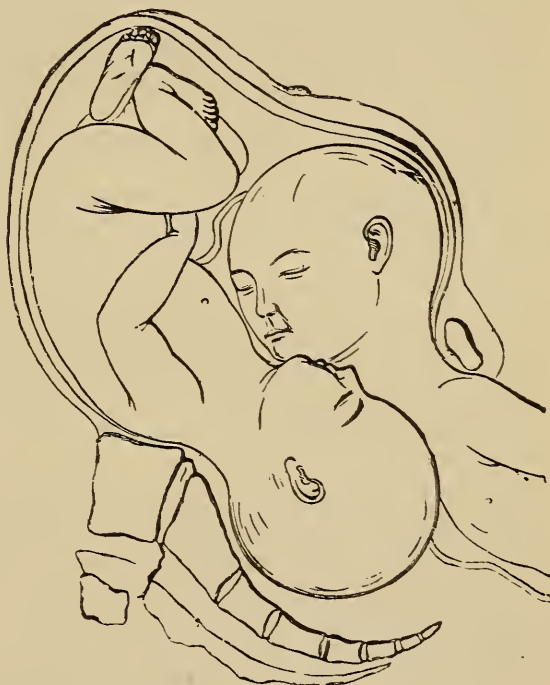
forceps are then applied to the other, that it may be "engaged," and thus prevent a recurrence of the complication.

If both heads have entered the pelvis—and such cases are recorded—it will probably be impossible to push one back into the uterus; in which case the forceps might succeed in delivering, though probably perforation would be necessary.

In what class of cases does interlocking of the heads occur?

In those cases in which one child presents by the breech and the other by the vertex (Fig. 37). The former is born as far as the head, when delay occurs. An examination now reveals the presence of the head of the second foetus within or at the brim of the pelvis, and the under part of the chins of both infants in contact. We must try to push the second child back, as in the case described above; or, if this is not possible, the forceps may be applied and an attempt made to draw the head past the body of the first child. If neither means proves successful, decapitation of the first child must be resorted to. This can be done by the scissors or *écraseur*; the body is then delivered, and afterward the second head removed with the forceps.

FIG. 37.



Locked Twins.

FETAL DYSTOCIA.

What are the simplest forms of foetal dystocia? and under what circumstances are they found?

(1) An exceedingly large child; (2) premature ossification of the bones of the skull. These may both be met with in women marrying late in life, though the excessive sign of the child is the more frequent cause of dystocia under such circumstances. Our first recourse is to the forceps, and if delivery cannot be accomplished craniotomy must be done.

When, as occasionally happens, the *delay* is of the shoulders and occurs after the birth of the head, traction may be made by drawing on the head or by the introduction of the fingers in the axillæ, and will usually be successful. If not, the arms, one after the other, must be disengaged and drawn down.

HYDROCEPHALUS, ENCEPHALOCLE.

State the method of diagnosing intra-uterine hydrocephalus.

Abdominal palpation will often lead us to suspect the condition, if it be present, on account of the disproportion between the head and breech. On vaginal examination after the rupture of the membranes, the head is felt as a large fluctuating mass with enormous fontanelles and broadly-separated sutures. The bones are apt to be very thin, and for this reason the head has been mistaken for a second bag of waters.

What can you say of the prognosis and treatment in these cases?

The *prognosis* both for mother and child is very grave. The dangers to the mother are from rupture of the uterus and injury to the soft parts.

The *treatment* varies according to the presentation. If the disease is but slightly developed, it may be possible to deliver by the forceps in vertex cases; and under such favorable circumstances there is likely to be little if any difficulty in delivering the head, provided the child presents by the breech. In most cases, however, craniotomy will be necessary. Of course in breech cases the perforation must be made through the occipital bone.

Name the congenital tumors of the skull which may cause dystocia.

Meningocele, which is a tumor over some point of the skull, made up of a portion of the meninges protruding through a congenital opening of the bones. This rarely, if ever, causes a delayed labor.

Encephalocele is the same as the above, excepting that some brain-substance in addition to the meninges is contained within the tumor.

Hydro-encephalocele contains meninges, brain-substance, and fluid. This is the only form of the three which might cause delay in the labor. If so, it should be punctured and the fluid evacuated. The further progress of the labor will not be materially influenced.

Dropsical effusions in the thorax or abdominal cavity, and malignant tumors of the liver, spleen, or kidneys, have occurred with resulting delay, but these cases are extremely rare.

MONSTROSITIES.

What is an anencephalic monster?

One devoid of a brain. The head is extremely small and rests directly

upon the shoulders; the eyes protrude and look almost in an upward direction; the tongue most frequently protrudes from the mouth.

What forms of double monsters are described?

(1) Two complete foetuses, normally constituted, but united at some point. The fusion may be either back to back, in which case it is at the sacrum; the two heads may be united; or the union may take place in front, when it generally extends from the umbilicus to the upper part of the thorax.

(2) A single body with two heads. These are made up of two bodies also, but they are so fused that no evidences manifest themselves externally.

The progress and mechanism of delivery in this class of cases must necessarily vary considerably, depending upon the form of the monster and its presentation.

If both heads present, one head may be born, then the other, and afterward the bodies, or mutilation of the infants must be resorted to.

In case the two heads attempt to enter the pelvis at the same time, and one cannot be pushed back, craniotomy must be done, unless the labor is a premature one or the heads are very small.

CHAPTER VI.

HEMORRHAGES, INJURIES, AND ACCIDENTS OF LABOR.

HEMORRHAGES DURING AND AFTER DELIVERY.

Do severe hemorrhages ever occur during labor? and what is the source of the blood if hemorrhage does occur at this time?

They do not, unless from placenta prævia or a low implantation of the placenta. There may be a little flood of blood from lacerations of the cervix or the os. These cease spontaneously, and only occur while dilatation is going on or just as the second stage is reached.

Or some hemorrhage may occur from abrasions or tears of the vaginal mucous membrane or perineum. These take place as the head passes through the pelvis or escapes from the vulva, and are very rarely serious. It occasionally happens in extensive injuries or lacerations that some large vessel is ruptured, but the position is such that clamping and ligation, if necessary, may be easily done, so that little if any harm ever results.

What is a post-partum hemorrhage? and what three varieties are met with?

A post-partum hemorrhage is a hemorrhage occurring *from the uterus*

after the birth of the child. This may be (1) immediately after the child is born, but before the third stage is completed; (2) after the birth of the placenta; (3) some hours after labor is completed. This last variety is called "secondary post-partum hemorrhage."

An alarming flow of blood may take place after the child is born from a badly-lacerated cervix, cases even occurring where the circular artery of this part of the uterus has been ruptured. These are not true post-partum hemorrhages, though unless care is taken they might easily be thought such.

A vaginal examination reveals the condition, and the *treatment* consists in passing a wire suture through the cervix, so as to close the rent and thus check the flooding.

State the frequency and causes of post-partum hemorrhage.

It is an extremely frequent complication of labor unless the case be managed properly throughout, under which circumstances it rarely occurs.

The one *cause* is uterine inertia. This may be brought about or produced in many ways. One very frequent cause of inertia is over-distension of the organ from twins or hydramnion. *Prolonged labors*, from exhausting the muscles; *precipitate labors*, in which the uterus is so rapidly emptied that it does not contract; and *rapid forceps deliveries*,—bring about the same result. A debilitated or exhausted condition of the mother from albuminuria, anæmia, or other diseases, and emotional causes in neurotic women, are also productive of the accident.

The causes of secondary hemorrhages may be any of the above, and in addition the retention within the uterus of portions of the placenta, the membrane, or large blood-clots. Any exertion, such as turning quickly upon the side or rising suddenly in bed, may cause it, as well as the free use of cardiac stimulants. Local conditions, in the way of distended bladder or full rectum, have also caused severe hemorrhage, as also the different forms of displacements, especially retroflexion.

What are the symptoms?

The flow of blood may occur suddenly and with a profuse gush, or may begin as a slight trickling, which continues only as such or later becomes more profuse. This may be the only symptom if the hemorrhage is immediately checked. If not, all the signs accompanying the loss of blood follow. The face becomes pale and anxious, the extremities cold, the pulse rapid and feeble; blindness and possibly syncope occur, or perhaps extreme restlessness supervenes and the patient throws herself about on the bed. The so-called "air hunger" is developed, the patient taking short, rapid respirations and crying for air; then a convulsion may occur, and in this the woman dies.

In cases of secondary hemorrhage we may be deceived in looking on the vulvar pad for blood and finding none, and so attribute the symptoms to some other cause. The absence of the flow is owing to the formation

of a clot at the cervix, which prevents the escape of the blood externally, and the only thing found on the dressing is a little clear serum.

In any case an examination of the abdomen immediately reveals the condition. We find, instead of the hard, rounded uterus, a soft, flabby-feeling abdomen, and are perhaps unable to map out the uterus, or, if we do make it out, it is large, with the fundus high up.

What is the treatment?

The *treatment* should be—

(1) *Preventive*.—From the time the head has emerged from the vulva until at least half an hour or three-quarters of an hour after the placenta has come away, the hand should be kept over the fundus of the uterus to prevent its relaxation. Then, as soon as a careful examination of the placenta and membranes shows them to be intact, a full dose of the fluid extract of ergot (3j–3ij) should be given as a routine practice in every case, and at the end of three-quarters of an hour the binder applied. The patient must be moved carefully and gently, and, above all, kept from any form of excitement.

If the above is carefully carried out in every case, a post-partum hemorrhage will be an extremely rare occurrence.

(2) *Curative*.—Our energies are all directed toward one thing, and that is to excite uterine contractions. Failing in this, recourse must be had to the use of styptics. The former is Nature's method of checking and preventing uterine hemorrhage, and unless all the reflex irritability of the organ is gone it will be successful.

As soon as the placenta is separated from the wall, which occurs during the last few pains, the muscular fibres contract firmly, completely closing the orifices of the torn utero-placental vessels: thrombi now form in these vessels, and, even though slight relaxation of the womb does occur, no hemorrhage results. Therefore, if we can bring about this condition of affairs when it does not take place, we accomplish what Nature has neglected to do. If the hemorrhage takes place before the birth of the placenta, sufficient friction over the fundus to cause a contraction and the delivery by Credé's method will generally be immediately followed by a cessation of the flow. However, we find cases where repeated attempts at Credé's method of expression fail, and in such cases the secundines must be removed by the introduction of the hand into the cavity of the uterus. With the umbilical cord as a guide we slowly pass the hand, which has been made thoroughly aseptic, into the uterus, and, reaching the placenta, carefully insert the fingers between it and the uterine wall, and gently dissect it off. Extreme care must be taken not to injure the delicate membrane lining the uterus, for it is at times difficult to distinguish between it and the placental tissue. A thorough uterine irrigation should follow any procedure of this kind.

If the hemorrhage occurs after the birth of the placenta, immediately attempt to excite contraction by friction over the fundus, and give the patient a full dose of ergot, or, better still, a hypodermic of ergotin.

While this is being done the nurse or assistant should be preparing a hot douche of carbolic acid, 1 : 80, or bichloride of mercury, 1 : 5000 or 8000, at a temperature of 118° to 120° F., and with a Chamberlin's tube an intra-uterine irrigation is given. The hemorrhage continuing after one or two pints have been used, we should not continue this longer, but resort to some other method of causing contraction; and one of the simplest and at times most effective is ice. A piece about the size of a walnut is carried up into the interior of the uterus and rubbed about its wall. If the organ does not respond, do not use a second piece, but if a faradic battery be at hand use a current with one pole over the fundus, the other in the uterus. The foot of the bed should now be elevated, and compression of the abdominal aorta may be tried before styptics are used if the hemorrhage continues. The aorta can be distinctly felt above the fundus uteri, and may be pressed against the vertebral column by placing the side of the hand crossways over it. This procedure is of very doubtful utility.

The three styptics most commonly employed are vinegar, the subsulphate of iron (Monsel's solution), and tincture of iodine. The first is used by soaking a cloth or piece of gauze in the vinegar, passing it up into the uterus, and squeezing it out. The others should be used *only* in solution. The strength of the solution of the subsulphate of iron may be about 1 : 4, and of the iodine 1 : 2; but *never* employ either unless you are sure of an avenue by which the fluid can escape. To be positive of this, pass two fingers through the cervix, so as to keep it open, and have a hand placed over the fundus of the uterus.

Our methods must all be supplemented by treatment directed to the general condition of the mother. Hypodermic injections of ether, whiskey, caffeine, strophanthus, digitalis, etc. may be necessary; hot bottles should be placed about the patient, the pillows removed from under her head, and the extremities bandaged. For this purpose ordinary cloth bandages may be used, being applied moderately tight from the toes to the pelvis and from the fingers to the shoulders. These may be left on until the patient rallies somewhat.

Absolute quiet must be enjoined, and the hand kept over the fundus of the uterus for several hours at least. Remove all soiled clothing from about the patient without moving her, and after a few minutes give a teaspoonful of brandy in hot water. If the stomach will retain this, the dose may be repeated every fifteen minutes until the heart begins to respond. If it is rejected, hypodermic and rectal stimulation must be resorted to. For the latter 8 to 16 ounces of hot water containing an ounce of brandy may be given through a rectal tube. At the end of a few hours small quantities of beef juice or mutton broth will usually be tolerated by the stomach. The patient should not be disturbed to change or remove the bed-clothes for at least fifteen or twenty hours.

The treatment of secondary hemorrhage is practically the same as that for primary, excepting that we must bear in mind the fact that this form is generally caused by the presence of some foreign body within the ute-

rine cavity. Therefore our first procedure will be to carefully remove this, whether it be placental tissue, membranes, or blood-clots, by the introduction of the hand. Afterward a douche is given, and as a rule firm contraction results. Always see that the bladder and bowel are empty.

In all cases of hemorrhage the loss of blood may be so excessive that transfusion or infusion becomes necessary. The method of doing this will be described later.

The *after-treatment* consists in the administration of a full, nutritious diet, tonics, and iron.

INVERSION OF THE UTERUS.

What is inversion of the uterus ?

It is the partial or complete turning inside out of the large, empty post-partum organ. As a rule, it begins as a slight depression of the fundus, which may remain so or continue to sink until the entire mucous coat is outside and the peritoneal inside. The former is called partial, the latter complete, inversion.

If the condition is seen and successfully treated immediately after its occurrence, it constitutes the so-called acute form, but if allowed to remain in its abnormal condition and adhesions form, it becomes chronic. Besides beginning at the fundus, cases are recorded where the inversion has begun at the cervix.

State the causes of inversion of the uterus.

There are three conditions which favor this accident—namely, uterine inertia, pressure from above, and traction from below. Naturally, a combination of the three might operate at the same time, under which circumstances the unfortunate occurrence would very likely result. When due to accident the causes generally given are traction on the cord while the placenta is still adherent to the uterine wall ; a very short cord or one wound about the body of the infant ; too rapid a delivery ; delivery in the erect posture ; and strong efforts at straining on the part of the woman.

Spontaneous inversions also occur. These are due to irregular contractions of the uterus. In some cases there is a relaxation or atony of the cervix and lower segment, while the fundus is in a state of active contraction. In others probably the reverse of this is the case : the atony is in the fundus and upper portion of the organ.

Describe the symptoms.

Pain, shock, and hemorrhage are always present in complete inversions. The former is excruciating, often causing the patient to cry out at the top of her voice with the suffering. The shock is due both to the pain and hemorrhage, as well as the withdrawal of the uterus from the abdominal cavity. The pulse becomes rapid and feeble, the face pale

and anxious, the extremities cold; there may be vomiting, syncope, convulsions, and death, or the acute onset of the symptoms is followed by remission, during which they all improve.

How is a diagnosis made?

The above symptoms, occurring immediately after labor, would naturally lead one to suspect this condition. On examining the abdomen the hard, rounded fundus is missed, and, rarely, the depression may be felt even through the abdominal wall.

A vaginal examination reveals the presence of a rounded tumor, to which the placenta is possibly attached. If only partial inversion exists, the tumor will be absent.

The condition is likely to be confounded with but one other—a uterine polypus—and here only when it occurs some days after delivery and comes on insidiously. The introduction of the sound will soon clear up the case. If a polypus be present, it will pass by it and up to the fundus of the uterus, but in a case of inversion it is arrested low down.

What can be said of the prognosis?

It is always very grave. The primary dangers are both from shock and hemorrhage, while subsequently sepsis may occur from a sloughing of the uterus in consequence of constriction of its neck. This is more likely to follow if the condition is not relieved at the time of its occurrence.

State the treatment.

In every case the *immediate* restoration of the organ to its normal condition is indicated; and this is usually attended with little difficulty if no delay occurs in making the attempt. Every minute passed renders reposition more difficult.

An anæsthetic should be administered in every case unless the patient's condition is such as to render it dangerous. If there be but a partial inversion and only to a slight extent, direct pressure with the fingers of one hand against the inverted portion, and counter-pressure with the other hand over the abdominal wall, are generally productive of good results.

If the inversion be complete, one of three courses of procedure may be adopted: (1) *direct* upward pressure of the uterus grasped in the hand and in the axis of the parturient canal; (2) pressure directly upon the fundus with the fingers made in the shape of a cone or with the fist; (3) Noeggerath's method, which consists in placing the index finger on one side of the uterus near the entrance of the Fallopian tube, and the thumb on the other. First one side is indented and then the other, and when this has been accomplished direct pressure is made on the centre of the inverted mass until reduction is complete. In all these methods counter-pressure is made with the other hand through the abdominal wall.

After reduction the hand should not be removed from the uterine cavity until firm contraction is obtained and the placenta is dissected from its attachment. The latter must not be removed before the inversion is relieved, as severe hemorrhage would likely result. An intra-uterine douche must always follow.

If the condition receives no treatment until days or weeks after its occurrence, taxis may still be tried, but is not as likely to meet with success.

Failing in all attempts at reposition, extirpation of the organ must be done as a last resort, though cases are recorded where spontaneous reduction has occurred.

RUPTURE OF THE UTERUS.

What extent of uterine rupture is seen?

There may be rupture of the neck alone, of the body alone, or of both at the same time. The laceration may extend in a longitudinal, transverse, or oblique direction, and it may be complete or incomplete. Incomplete rupture extends only through the muscular wall, while complete involves the entire thickness, passing through the peritoneal covering.

The usual seat is on the posterior surface, and more frequently on the left side of the median line.

What can you say of the frequency and causes of uterine rupture?

Statistics vary greatly in regard to this most terrible accident of parturition. It fortunately is extremely rare, occurring probably not oftener than in 1 in 4000 cases. ~~It is only seen in primiparæ.~~

The *causes* may be divided into predisposing and immediate. The predisposing causes are multiparity, abnormal presentations, deformed pelvis, disproportion between the fœtus and the pelvis, prolonged labor, and thinning of the lower zone of the uterus.

There may be in multiparæ an alteration in the muscular fibres of the uterus. This consists in a degeneration or softening, which causes a weak power of contraction, and thus a prolonged labor; or the rupture may occur from the softness of the muscular fibres, even though the labor be not prolonged.

Abnormal presentation, especially trunk or shoulder, often causes rupture.

Lack of proportion between the child and pelvis is seen in deformed pelvises and hydrocephalic children. As a matter of fact, rupture occurs more frequently with slight deformities. This is explained by the supposition that with slight deformity the lower segment of the uterus is crowded down into the pelvis and pressed against the brim, causing injury.

Prolonged labors after a time cause a thinning of the lower uterine

segment. At the same time there is a retraction of the muscles on the upper zone, and a resulting thickening: a strong contraction occurs and rupture results. This condition is by far the most frequent predisposing cause.

The immediate causes of rupture are—(1) mechanical injury, either from manipulation, blows, falls, etc., or pressure of the uterus between some part of the child and the pelvic wall, causing a congestion, inflammation, or sloughing of the tissue; (2) strong uterine contractions.

Describe the symptoms.

Premonitory symptoms have been described, but they are too vague to even mention. The accident usually takes place very suddenly and during a strong expulsive pain, and is accompanied by a severe agonizing pain associated with a tearing sensation. It is said that a snapping sound, audible to the patient and bystanders, sometimes occurs at the time of the rupture. Uterine contractions immediately cease: the pulse becomes irregular, rapid, and thready; the face is pale; the body is covered with a cold perspiration; the respirations are rapid, shallow, and sighing; nausea and vomiting take place, and may be followed by blindness, ringing in the ears, and possibly convulsions. There is always more or less hemorrhage, though this may not be visible, as the blood escapes into the abdominal cavity.

How is the diagnosis made?

On making an abdominal examination the foetal parts are felt just under the hand, and a tumor entirely separate from the child is appreciated. This is the uterus. Vaginal examination fails to find any presenting part. It has receded from the reach. The rent in the uterus may occasionally be felt, and it sometimes happens that a loop of intestine has slipped through it and is visible at the vulva.

What is the prognosis?

Very grave. Death may occur immediately from shock or hemorrhage. The child almost invariably dies. For the mother the prognosis depends considerably upon the extent of the laceration, and whether or not the fetus has escaped into the abdominal cavity. Statistics show about 10 or 15 per cent. of recoveries.

State the methods of treatment.

Prophylactic.—This consists in terminating a labor which is becoming so prolonged as to cause a thinning of the lower uterine segment, and in immediate delivery, either by craniotomy or embryotomy, in case a very thin lower segment is found. All rough or improper manipulations during labor are to be avoided.

In case rupture has occurred, one of two courses is to be pursued, depending upon the conditions present (any form of expectant treatment is never justifiable):

If the rent be small and the child has not escaped into the abdominal cavity, deliver as rapidly as possible. Whichever method offers the greatest chance for a speedy delivery should be employed, whether it be the use of forceps, version, craniotomy, or embryotomy. After the birth of the child, carefully and gently remove the placenta and wash out the uterine cavity with warm distilled water.

If the fœtus has partially or wholly escaped into the abdominal cavity, laparotomy is the only treatment. Remove the child and blood-clots, wash out the abdominal cavity, and sew up the uterus.

Some go so far as to recommend laparotomy in every case of ruptured uterus, though the majority are hardly of the opinion that this course is justifiable.

The after-treatment consists in stimulants, a light nutritious diet, opium if necessary, and the introduction of a long glass drainage-tube into the uterus and just through the rupture if laparotomy has not been done. At the end of a few days, when adhesions have formed, the uterine cavity, if necessary, may be occasionally irrigated with warm sterilized water.

ACCIDENTS TO MOTHER, AND SUDDEN DEATH.

Name the injuries which may occur along the parturient canal during labor.

(1) *Lacerations of the Os Externum*.—These almost invariably occur with every labor, and are of no consequence.

(2) *Lacerations of the Cervix*.—These may be slight and confined to one side only (unilateral); they may take place on both sides (bilateral); or there may be lacerations throughout the entire circumference of the cervix (stellate). Cases have occurred where a narrow ring of the cervix has been torn away.

It rarely happens that any immediate *treatment* is necessary unless the hemorrhage be profuse, in which case the application of some styptic (subsulphate of iron) will immediately check the flow of blood, and the cervix may be repaired after the woman has recovered from the effects of parturition.

(3) *Lacerations of the Vagina*.—These never become grave unless occurring in the upper portion of the canal. A few cases are recorded where the rent has taken place in the vault and fornix, causing symptoms similar to those occurring with rupture of the uterus. However, they are extremely rare. Injury farther down should be repaired when labor is completed.

(4) *Tears of the Vulva* will, as a rule, be of little moment unless such injury occurs as to cause thrombosis. This condition has already been described.

(5) *Injuries to the Perineum*.

(6) *Injury to the Pelvic Joints*.—This rare occurrence may be the result of violent deliveries, especially when some disproportion exists between the

head and pelvis, or it may be the result of pathological changes in the articulations. It consists in a slight tearing apart or loosening of one of the joints, most frequently the pubic.

Some pain upon moving about will be the only *symptom*.

The *treatment* consists in the application of a bandage which will render the joint immovable. Complete rest must be enjoined.

State the causes of sudden death during or immediately after delivery.

(1) Exhaustion and suffering (very rare); (2) air in the uterine sinuses; (3) mental emotion; (4) affections of the respiratory organs (acute pulmonary congestion and œdema); (5) thrombosis and embolism; (6) rupture of the aorta from increased tension, owing to the uterine contraction; (7) diseases of the heart. A few other causes of sudden death at this time have been described, but they are of extremely rare occurrence. Many causes have already been described—inversion and rupture of the uterus, hemorrhage, etc.

Is death from emotional causes often seen?

It is not, though a few cases are recorded where extreme joy or sorrow has been the cause of sudden death after labor, and in which an autopsy revealed no pathological conditions.

State the causes and symptoms of the access of air in the uterine sinuses?

Air enters the uterine sinuses generally from improper management of the patient immediately after labor, though it may be a purely unavoidable accident. Carelessness in allowing air to pass through the tube in giving an intra-uterine douche, and in carrying the hand into the uterus when this is necessary, is the most frequent way.

The *symptoms* are extreme pallor, dyspnœa, perhaps vomiting, collapse, and death.

What disease of the heart most frequently causes death at this time?

Fatty degeneration alone or associated with dilatation. Rupture of the organ may occur from a myocarditis, as well as the above, and is sometimes due to violent straining efforts.

What are the usual seats of puerperal thrombosis? State the causes?

The pulmonary arteries and the right side of the heart are the usual seats. The primary causes of thrombosis are some mechanical obstruction, around which coagula form; an impeded or arrested circulation; and pathological changes in the blood which render it more easy of coagulation.

The fact that at least two of these conditions exist in the puerperal state renders the accident more frequent at this time than under ordi-

nary circumstances. The blood of the post-partum woman is very coagulable, owing to the increased amount of fibrin already spoken of; then the exhaustion, and perhaps hemorrhage, immediately succeeding labor predispose to thrombosis. The great majority of cases occur after a post-partum hemorrhage.

Describe the symptoms.

Either a thrombosis of the pulmonary vessels or of the right heart causes practically the same symptoms, though in the latter death is likely to occur more quickly. No premonitory signs occur, and the patient seems to be doing well when she is suddenly attacked with the most violent dyspnoea. The face is either cyanotic or pale, and the struggles to get air are frightful. The pulse is rapid and feeble or entirely absent: there is a sense or feeling of impending death, which may occur almost immediately in a convulsion, or the symptoms may improve somewhat.

The *prognosis* is very grave, though cases have recovered and the clot become absorbed.

Is there any treatment for this condition?

Death generally results too soon to allow of any plan of treatment being carried out. If this does not occur immediately, we should keep the woman at absolute rest and administer stimulants.

What can you say of embolism?

It is an obstruction to the circulation, the result of either a detachment of a portion of a thrombus or of a detached vegetation from one of the cardiac valves.

The *symptoms*, if it occur in the pulmonary artery and right heart, are exactly the same as those described above, though their onset may be more gradual.

CHAPTER VII.

OBSTETRIC OPERATIONS.

INDUCTION OF ABORTION AND PREMATURE LABOR.

State the most frequent causes demanding the induction of abortion.

(1) Extreme contractions of the pelvis (below 2 inches); (2) encroachment of large tumors on the pelvic canal; (3) cicatrices of cervix or vagina not admitting of dilatation; (4) some cases of cancer of the cervix; (5) irreducible retroversion or procidentia of the uterus; (6) fixing of uterus by adhesion; (7) some uterine tumors; (8) uncontrollable vom-

iting with progressive emaciation and exhaustion; (9) some cases of albuminuria with nephritis; (10) some cases of chorea and insanity; (11) placenta prævia; (12) heart diseases with extreme dyspnœa; (13) cystic degeneration of the chorion (McLane).

When should premature labor be induced?

Premature labor is any labor occurring after viability of the child, but before full term. Any condition, either of the mother or child, which would render dangerous or fatal the continuance of pregnancy calls for the induction of premature labor.

Conditions of the fœtus demanding it are (1) an habitually large size of the head or premature ossification of the bones of the skull, as shown by former labors. In this case the woman should be allowed to go nearly to term. (2) Repeated deaths of the fœtus in utero during the latter part of gestation. This is caused by some form of degeneration of the placenta. (3) Death of the fœtus in utero.

Conditions of the mother which call for this operation may be any of those mentioned under the indications for abortion: pelvic deformity, forbidding delivery at term; uncontrollable vomiting; advancing albuminuria, or jaundice; eclampsia; placenta prævia; hydramnion. when dyspnœa is urgent; extensive ascites; grave diseases of lungs or heart; tumors, etc.

It should always be borne in mind that neither an abortion nor a premature labor should ever be induced without a consultation, unless the case be urgent and no time allowed for calling a consultant.

When is the period of viability?

There is a fair chance for a living child after 210 days, though between this time and 230 to 240 days there must be a strong feeling of uncertainty. After 250 days we may feel sure of a living fœtus. Always count from the last day of the last menstruation.

What should be the prognosis when labor is induced?

Always guarded, though depending almost entirely upon the cause demanding the operation.

The uterus is not ready to expel its contents; manipulations are necessary; hence greater risks of hemorrhage and sepsis; not only these, but the condition of the mother calling for the operation may be such as to add other dangers.

For the child it is never very good unless the gestation be near term.

What is the best method of inducing abortion?

Puncturing the membranes with a Sims sound. Contractions, as a rule, will soon come on, and the fœtus, membranes, and placenta all be expressed. If any of the secundines be retained, the cervix must be more fully dilated, and with a dull curette the entire cavity cleaned out. The fingers are preferable to the curette if the pregnancy has advanced to the fourth month. Bear in mind the fact that *absolute* cleanliness

and antisepsis must be observed in the performance of the operation. Thorough cleansing of the parts about the vulva, a vaginal douche, sterilization of the instruments and the hands of the operator and his assistants, *must* precede any manipulation.

The *after-treatment* of abortion is just as it is for labor at full term.

Mention the different methods for the induction of labor, and state which are the best.

(1) Rupture of the membranes; (2) intra-uterine douches; (3) introduction within the uterus of a gum-elastic catheter or bougie; (4) dilatation of the cervix; (5) vaginal douches; (6) tamponing vagina; (7) electricity (either the galvanic or the faradic current); (8) use of medicines, either oxytocics or purgatives. Several others have been used, but are entirely discarded. Among those mentioned, but two should be used, taking as adjuncts some of the others. These are puncture of the membranes and the introduction of a flexible bougie. Combined with either of these, vaginal douches, dilatation of the cervix, and tampons may all be of great utility in some cases; but the use of any of the latter three alone is to be discouraged.

Describe the steps to be taken in inducing labor in a case of albuminuria or a contracted pelvis.

The methods now to be described are to be pursued in all cases where time is allowed. In some cases of placenta prævia or eclampsia, as has been mentioned, the immediate rupture of the membranes is indicated:

(1) Preparation of the patient and the selection of the time; (2) preparation of the implements, operator, and assistants; (3) introduction of the bougie; (4) removal of the bougie. The evening is, as a rule, preferable for introducing the bougie: as the pains generally will not begin before morning, the labor may be terminated by the following night, and thus neither patient nor physician loses any sleep.

The preparation of the woman consists in giving her a warm vaginal douche of bichloride of mercury, 1 : 5000, or of carbolic acid, 1 : 60 or 80, emptying the bowel by an enema, and noticing that the bladder is also empty. She should then be placed so that the buttocks come to the edge of the bed. A gum-elastic bougie (No. 12 American is a desirable size), perfectly new, should be placed either in a solution of carbolic acid, 1 : 20, or of bichloride of mercury, 1 : 1000 (cold), and allowed to be thoroughly immersed for at least half an hour before its introduction. A needle carrying a long piece of silk suture should be passed through the end of the bougie, that it may be easily withdrawn when necessary. Cotton tampons, sterilized, are to be at hand. The hands and arms of the physician and his assistants must be scrubbed with soap and water, washed with alcohol or ether, and submerged for a minute or two in the bichloride solution.

Everything now being in readiness, a little chloroform is given. The first two fingers of the right hand are introduced to the cervix, and,

using them as a guide, the bougie is passed through the os into the uterus. Very gentle pressure must be exerted, to prevent if possible rupturing of the membranes. If any obstruction be encountered, the bougie should be immediately withdrawn, as it has probably come in contact with the placenta. Now introduce it on the opposite side. At least eight or nine inches are passed into the uterus, one or two tampons introduced to prevent its slipping out, and an aseptic vulvar pad applied.

It sometimes happens that the os is too tightly closed to allow of the introduction of the bougie. If such be the case, some dilatation must first be accomplished by the employment of a pair of hard dilators or the finger. A bougie is preferable to the gum-elastic catheter, as it contains no opening or eye through which air or sepsis might get up into the uterus.

At the end of a few hours the pains will usually begin, and when the patient is seen in the morning labor may be well under way. Now remove the tampon. From now on the case is to be managed as one of normal labor, only that the bougie must be withdrawn when the os is about one-half or two-thirds dilated.

Is it ever necessary to resort to other methods or means?

It is. Though uterine contractions *may* begin within a couple of hours, cases occasionally go for days without labor beginning. The instrument should not be allowed to remain longer than twenty-four hours if the desired results do not follow. Remove it and introduce *another* in some other part of the uterus, or first dilate the cervix with Barnes' bags. This is frequently a very valuable accessory.

In case rapid delivery should become imperative after contractions have begun, the dilators may also be used until the cervix will admit of the application of the forceps.

What care should a premature infant receive?

It must be carefully wrapped in plain cotton and kept in a warm place. Do not allow a bath to be given for two or three weeks at least. It should be *fed*, and not allowed to nurse, as the effort is too exhausting. If possible, a wet-nurse ought to be obtained, and, beginning a few hours after birth, she should squeeze from her breasts a couple of teaspoonfuls of milk, which may be given to the child with a spoon or medicine-dropper every couple of hours during the night as well as day.

VERSION.

What is version?

Version or turning is the operation by which the position of the fœtus in utero is altered, so that some one portion of the body is substituted for the part originally presenting.

There are two general varieties: *cephalic*, or the substitution of the head for some other part; and *podalic*, or the substitution of the feet for another part.

How may versions be done?

Either cephalic or podalic may be done by *external* manipulations alone, by *internal* manipulations alone, or by *external* and *internal* combined. "Bimanual" means the using of both hands. "Bipolar" means that during the operation both poles or extremities of the fœtus are acted upon by the two hands.

State the indications requiring cephalic version, and what conditions are favorable to its successful performance.

Malpositions of the fœtus are the general indications for this variety of version, and more especially transverse or shoulder presentations. It may also be indicated in slight pelvic contractions, where during the last month of gestation the head lies out of the pelvis in one iliac fossa. Some advise its performance in breech presentations. It is contraindicated where, from one cause or another, rapid delivery is desired.

The conditions which make the operation most favorable are—an unruptured amniotic sac; a movable fœtus; an opportunity of operating before labor has begun, or at least before the pains have become strong and the os dilated; a multipara.

Describe the method of doing an external cephalic version.

The patient is placed upon her back, with the legs flexed at the knees and the thighs on the pelvis. One hand is placed over the head, the other over the breech of the fœtus. Gentle downward pressure is made with the one, pushing the head into the pelvis, and at the same time upward pressure is made on the pelvic extremity. As soon as the position is rectified place a compress of some kind (a folded towel will answer) over the lower part of the abdomen, where the breech formerly rested, and another at the opposite side of the breech; then apply an abdominal binder.

Describe the combined method.

The external method having been tried without result, we should then resort to the combined method. Many have been described, but none have met with so much success as the Braxton-Hicks method.

Care is taken to see that both the bladder and rectum are empty before proceeding. Ether should be administered to the surgical degree. A warm antiseptic vaginal douche is given and the hands rendered thoroughly sterile. Then introduce one hand into the vagina and two fingers through the cervix. The shoulder will be felt lying over the os, and this is pushed upward in the direction of the feet. At the same time, with the free hand over the abdomen the breech is pushed toward the median line or the head crowded down into the pelvis. We now have the head between the two hands, and if there is any tendency to a face presentation it may easily be rectified.

If the membranes be intact at the completion of the operation, they

should be ruptured, that the tendency to a return to the abnormal position be obviated.

Is internal cephalic version ever indicated?

Only in cases of face presentation with the chin posterior. The method of rectifying this condition has already been spoken of under *Face Presentations*.

What are the indications for podalic version?

Any of those mentioned under *Cephalic* when this has been tried unsuccessfully; placenta prævia; some cases of prolapse of the funis; rupture of the uterus; shoulder presentation with prolapsed arm; eclampsia.—in fact, any case in which rapid delivery is necessary, and where this can be accomplished most speedily by securing a foot and extracting.

What are the conditions essential to its successful performance? and when is it contraindicated?

(1) An os nearly or completely dilated, or at least one capable of dilatation (soft). (2) Unruptured membranes or a uterus from which the liquor amnii has just escaped. (3) A presenting part that is not wedged into the pelvis, and preferably before engagement has taken place. (4) A pelvis roomy enough to allow of the introduction of the hand.

Podalic version is absolutely contraindicated in cases where the labor has been so prolonged that the lower segment of the uterus is thinned out, or where, from some cause or other—generally from the improper administration of oxytocics—the uterus is spasmodically contracted over the child. Rupture in either case is almost sure to result. It is also contraindicated with marked pelvic contractions or a vaginal canal of diminished size.

What should be the position of the patient? and what should always be in readiness when podalic version is done?

The dorsal decubitus is probably always desirable, the patient lying crosswise in the bed, with buttocks well to the edge. Just as in all obstetric operations, the bladder and bowel should be emptied and a vaginal douche given.

The forceps must be at hand, in case they are needed for delivery of the after-coming head, and, as the child is likely to be born asphyxiated, hot and cold water, ice, warm blankets, alcohol, etc. must be in readiness, that no delay in its resuscitation may occur.

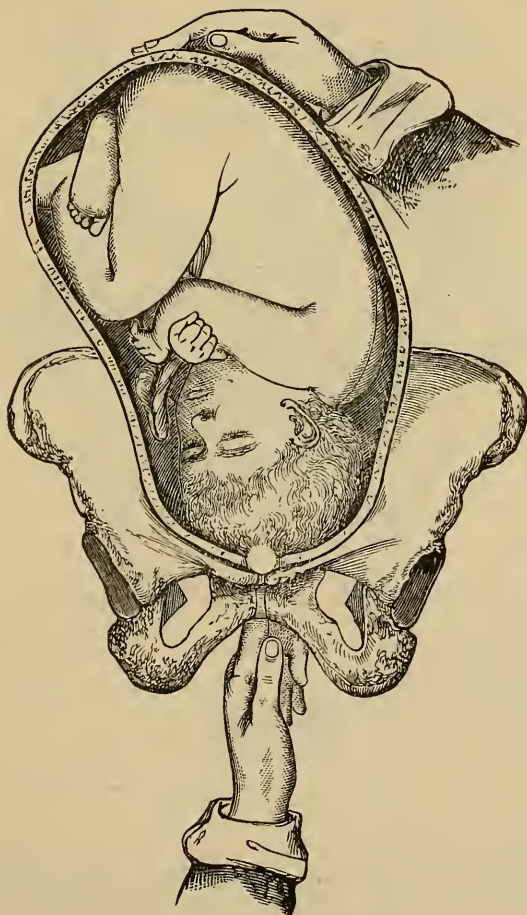
An anæsthetic—preferably ether—should be administered. The choice of the hand to be introduced into the vagina is generally considered of little importance: however, as it may become necessary to introduce it entirely into the uterine cavity, it is advisable to follow this plan: If the abdomen of the foetus points to the left side of the mother, the right hand of the operator is used, and *vice versa*.

Describe the combined or Braxton-Hicks method.

It resolves itself into three stages: (1) The introduction of the hand; (2) the removal of the presenting part and substitution of the leg; (3) extraction.

The hand is gently and carefully introduced into the vagina, pressing continually upon the perineum, and not the soft parts under the symphysis, and the two fingers passed through the cervix.

FIG. 38.

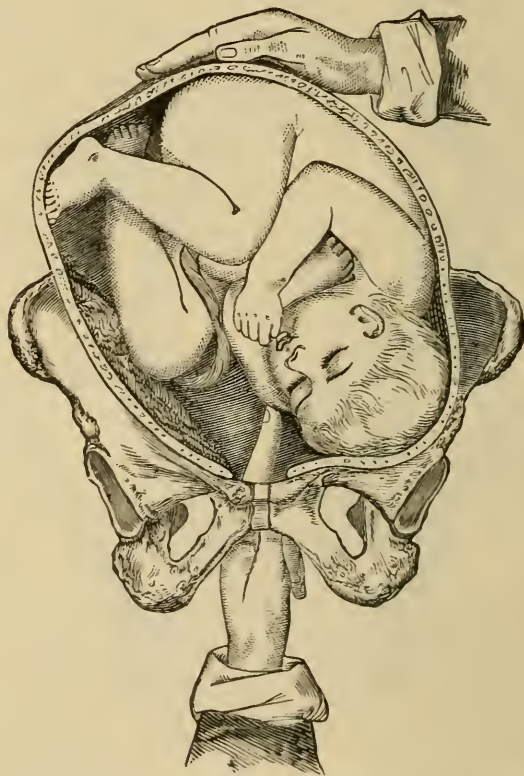


Braxton-Hicks Method of Version: first step.

If the case be a vertex, the fingers are in contact with the crown of the head, and an attempt must be made to push it in the direction toward which the occiput points (Fig. 38). Thus in the first and fourth

positions it is pushed toward the left, and in the second and third toward the right. With the other hand over the abdomen the breech is pushed downward on the opposite side. The shoulder will now come within reach, and it is pushed along in a similar manner (Fig. 39); at the same time the breech is still further depressed. The membranes, if not already so, must now be ruptured, that a knee or foot may be seized and

FIG. 39.



Version: second step.

drawn down into the vagina (Fig. 40). The external hand should then be changed to the cephalic extremity, and upward pressure made upon this.

If the shoulder present, and the arm be not prolapsed, and if the membranes are still intact, we would naturally attempt a cephalic version. Failing in this, the course of procedure described above would be pursued.

FIG. 40.



Version : third step (beginning).

What advantages has this method over the internal?

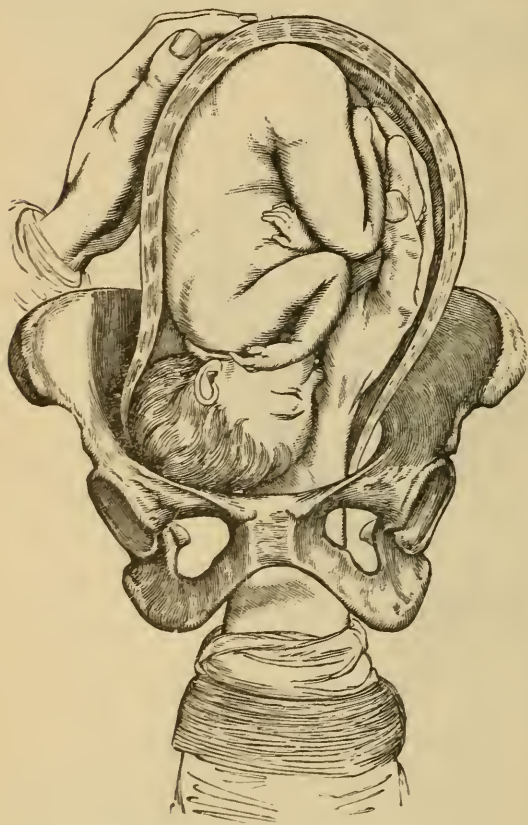
The hand does not have to be introduced into the uterus. This is a procedure always accompanied with some considerable risk, not only that there is greater danger of carrying in sepsis, but with the organ in active contraction and its cavity completely filled we add the danger of possible rupture by over-distension.

Describe the operation of internal version.

This is usually a very easy operation, provided the membranes have but recently ruptured. In vertex cases the hand is introduced into the vagina with a slow, boring motion until the cervix is reached. If this be dilated sufficiently to allow its passage, push the hand through, by the face and up along the abdomen of the child. As soon as a uterine contraction begins cease all manipulations and allow the palm of the hand to press firmly against the belly of the foetus, that the knuckles may not injure the uterus. As we pass along up, the elbows, arms, and hands are felt, and just above a knee is found. The finger and thumb

are hooked around this (Fig. 41) and traction made, stopping as soon as the uterus contracts.

FIG. 41.



Internal Version : grasping the foot.

the internal versions. The arm after being snared is not touched, but allowed to slip up into the uterus as the breech descends and the head rises.

Which foot should be brought down in doing an internal version? and would you ever bring both?

In vertex cases it is perfectly immaterial which knee is seized; simply secure the one most easy of access. In transverse presentations where the back of the child lies anteriorly, many recommend drawing down the upper foot, while some think it better to take the lower.

It is never advisable to draw down both limbs, unless the os be com-

As we draw downward upon the leg our manœuvres may be much facilitated by upward pressure on the child's head, with a hand over the abdomen.

If the membranes are intact when the operation is begun, they should be ruptured as the hand is passed through the os.

In shoulder presentations the only difference lies in the fact that the feet will not be found as high up.

If the arm be prolapsed, a piece of muslin a couple of inches broad should be fastened about the wrist, and made long enough to permit the end to remain outside of the vulva after the child is turned. As traction is made upon this during the delivery of the body and head, the arm is swept over the face, and the unfortunate complication of an extension of this member thus prevented. The operation of turning in these cases does not differ in the slightest from

pletely dilated, the pelvis roomy, and the parturient canal large; and even under these circumstances it is not necessary.

How would you proceed in regard to the extraction of the fœtus?

From the time the leg has been brought into the vagina the case is to be treated exactly as a breech presentation. If the fœtal heart is good and the condition of the mother does not demand immediate delivery, allow this to be accomplished by the natural forces. We always have present a condition of affairs where delivery can be completed within a very short space of time if it becomes necessary; and as there is more danger of extended head and arms if traction is made, we should not resort to it unless the conditions present demand such interference.

What are the dangers of version? Mention the difficulties often encountered during its performance.

To the mother, rupture of the uterus, injury to the organ so that inflammatory conditions result, and sepsis are the grave dangers. To the child, injury, or even death, may be caused by our manipulations. The difficulty frequently encountered is a failure of the head and shoulders to ascend as the foot is drawn down. Upward pressure over the abdomen may be sufficient to cause these parts to recede. If not, a noose may be slipped over the ankle and traction made upon this, while with two fingers in the vagina upward pressure is made on the shoulder.

Cases now and again occur where all attempts at the hands of the most competent operators fail, and embryotomy or craniotomy becomes necessary.

THE FORCEPS.

What are the requisites of a good pair of obstetrical forceps?

(1) They should be easy of application and removal. (2) They should retain their hold and not slip. This will be accomplished if they possess the proper cephalic and pelvic curves. (3) They should be strong and of proper length. (4) They must have as little divergence as possible at the shank. (5) The shoulder should be broad and strong.

The ordinary forceps are about 14 inches long, and composed of three parts—blades, shank, and handles. The former may be perfectly solid or fenestrated, and are distinguished as right and left or male and female.

There are the so-called axis-traction forceps of Tarnier, as well as many modifications, which differ from the original instrument principally in possessing a curved handle, which is fastened near the base of the blades, and by which traction can be made directly in the axis of the pelvic canal.

What powers may be exerted by the forceps?

(1) *Traction*.—The amount used must depend entirely upon the conditions demanding their use.

(2) *Compression*.—A little is always necessary, but it should never be kept up continuously. The forceps are not maintained in apposition with the foetal head by compression on the handles, but by pressure exerted upon the blades by the soft parts and pelvis of the mother.

(3) *Leverage*.—This, though perhaps slight, is exerted, or should be, in every forceps delivery.

State the difference between “high” and “low” forceps operations.

When the instrument is applied with the head at or above the brim of the pelvis, it constitutes the “high operation.” When low down or at the pelvic outlet, it constitutes the “low operation.”

Mention the conditions necessary for their use.

(1) The membranes must be ruptured; (2) the os must be dilated or capable of dilatation; (3) there must be no obstruction to delivery that we cannot reasonably expect to overcome; (4) the position of the head must be positively ascertained; (5) the bladder and rectum must be empty.

What are the indications for their use?

Any condition, either of mother or child, requiring prompt delivery. However, the most frequent cause necessitating forceps delivery is inertia uteri.

Describe their application.

There are two methods of applying the forceps. One is called the “cephalic application,” the other the “pelvic.” In the former the operator introduces the blades so that one may lie on each side of the head, while in the latter they are introduced on the sides of the pelvis without regard to the position of the foetal head.

It is best to adopt a plan whereby these methods may be combined. In other words, if the head lies in the oblique diameter do not introduce the blades at the sides of the pelvis, but one a little posteriorly, the other anteriorly, to an imaginary transverse plane at the outlet. The application consists—(1) of their introduction; (2) of their locking; (3) of traction; and (4) of the unlocking and removal.

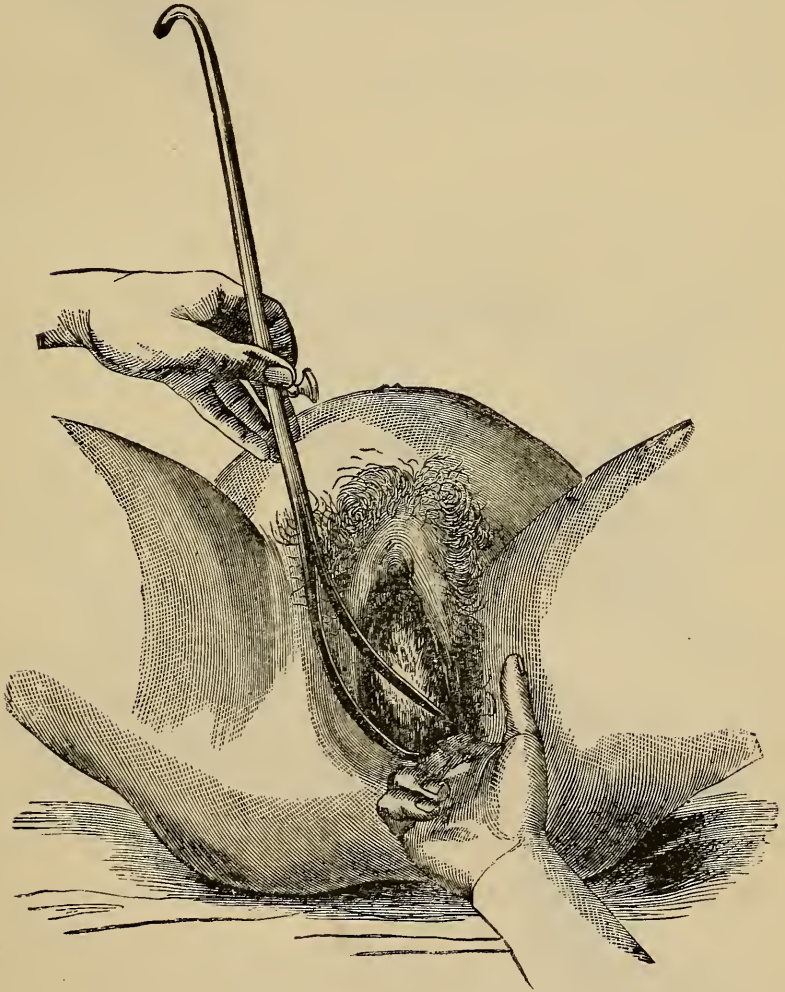
The forceps should be boiled or sterilized after each using, that they may be thoroughly clean, and before their application placed in a pitcher containing a 10 per cent. solution of warm carbolic acid. The bladder and bowel are emptied, a vaginal douche given, and the patient placed at the edge of the bed, with buttocks at right angles to it. Chloroform to the obstetrical degree only is generally sufficient in “low operations.”

The blades are removed from the solution and their outer surface covered with sterilized or carbolized vaseline or glycerin.

The left blade is grasped at the shank between the fingers and thumb of the left hand, while the three fingers of the right hand are introduced

on the left side of the vagina until they come in contact with the head. Hold the blade at first almost perpendicularly (Fig. 42); then pass it

FIG. 42.

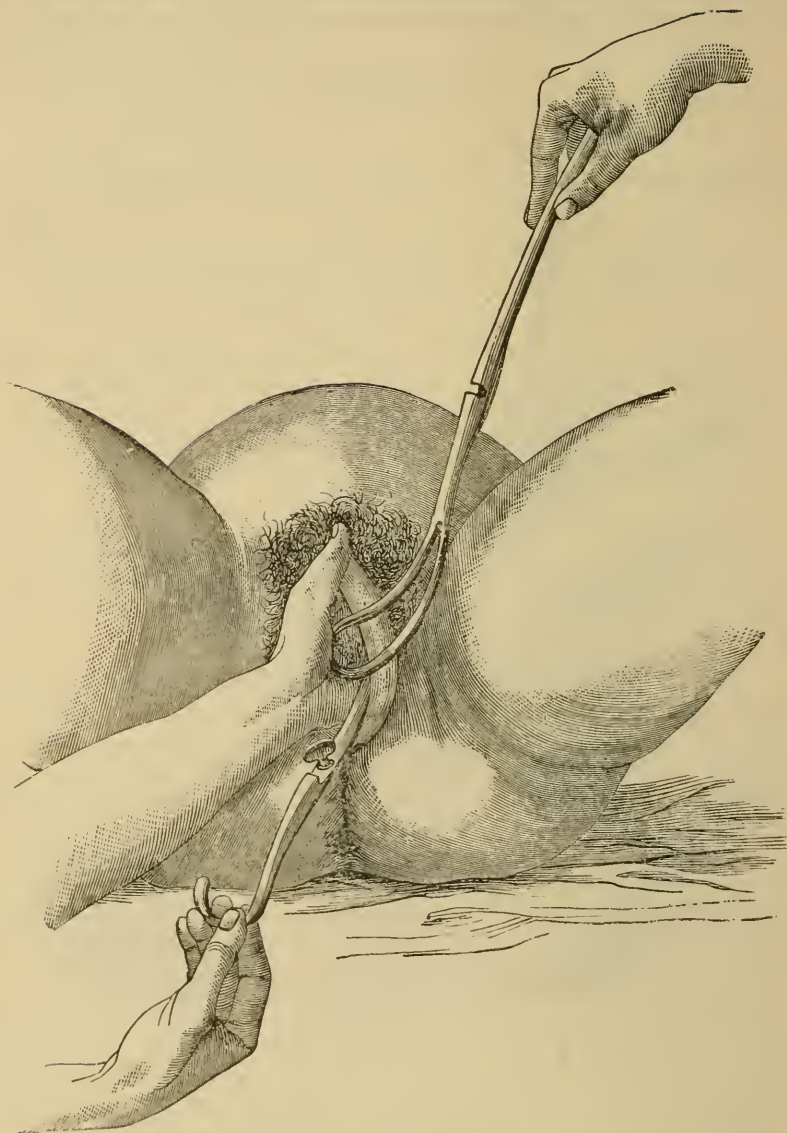


Introduction of First Blade.

along the palmar surface of the fingers, gradually depressing the handle as the instrument passes in, until by the time its introduction is complete the handle points in a slightly posterior direction.

The handle is now gently held by an assistant, to prevent its expulsion during a contraction or its twisting from position while the right blade is

FIG. 43.



Method of Introducing Second Blade.

applied. Introducing the three fingers of the left hand on the mother's right side, this is passed in exactly the same way (Fig. 43).

Now taking the handles with the two hands, they are gently depressed

toward the perineum, and the lock slips into position. Always see that neither a small fold of the perineum nor any hairs are caught in the lock.

In the application of the forceps a good rule to follow is this: Use the greatest gentleness and care in the introduction, and if, this being done, they slip in easily and lock without any difficulty, you may be sure everything is all right and that they are properly applied. If the slightest resistance is met with either in the introduction or the locking, immediately withdraw the blades and reapply. Introduce the blades during the intervals between the pains.

How should traction be made?

Always in the axis of the parturient canal, and intermittently. Allow the arm to rest against the side or front of the chest, and make traction only with the forearm and in this way: With the palm of the hand looking upward, the index finger is applied to one shoulder, the second and third fingers to the other, the shank resting in the crotch between the fingers. When a pain occurs steady traction is made, first in a downward direction, later in a horizontal one, and as the head emerges from the pelvis in an upward direction. The two fingers of the left hand should rest against the descending head to guard against the possibility of a too sudden and rapid descent, or, if it is necessary to exert any compression, this hand may grasp the handles of the instrument; but as a rule this will not be called for. No oscillatory movement of the handles is necessary. As soon as the contraction ceases discontinue traction.

When should the blades be removed?

In ordinary vertex cases as the head begins bulging the perineum the forceps should be removed, as there is always danger of laceration if this is not done. The experience of a few forceps deliveries will teach us more in regard to the proper time for their removal than description possibly could. If the maternal condition is such that a short prolongation of the labor might be injurious, deliver the head with the blades still applied. The same may be said in regard to the fœtus. If the heart has stopped beating or is growing slow and irregular, a rapid delivery is indicated.

The after-coming head in breech cases must be delivered with the forceps applied.

Describe forceps deliveries with the occiput posterior.

In these cases we should never apply the forceps until Nature has been given an opportunity of causing anterior rotation, or at least until the condition of mother or child necessitates their use.

The instrument is applied in exactly the same manner as already described, and traction made in the axis of the pelvis until the head has reached the perineum. It will often be found at this time that rotation has taken place within the blades, or, as sometimes happens, the instru-

ment turns with the head. In any case we remove the blades after the head has descended upon the perineum and give Nature another chance. If delivery does not take place, they may be reapplied, and now the traction, instead of being made upward, must take place *backward* toward the perineum, as the face should be born first under the symphysis.

Describe the high forceps operation.

This is a much more serious and difficult procedure than the low operation, and in a majority of cases version may be much more easily done. However, cases do arise where it seems the only indication. The head will lie either in a transverse or an oblique direction, never directly antero-posteriorly, so that one blade must lie over the occiput and the other by the face as they are introduced in the sides of the pelvis.

The cervix will probably be not completely dilated, and the head may lie so high up that it becomes necessary to introduce the whole hand into the vagina, passing two or three fingers within the cervix to rest against the head, which is steadied by the hand of an assistant placed over the abdomen. The blades are applied as in the low operation, though their application is usually attended with much more difficulty. The same precautions are to be taken in locking the instrument. Traction must be made first in almost a backward direction; and here is where the axis-traction forceps are of great value. Nevertheless, the ordinary instrument may be used in these cases, though always with much more difficulty.

When can the forceps be used in face cases? and how are they applied?

When the chin points either anteriorly or to one or the other side of the mother—*never* if posteriorly, for delivery by forceps in such cases is absolutely impossible. Their application, if the fronto-mental diameter lies in conformity with the antero-posterior of the pelvis, is simply in the sides of the pelvis; but if it lies in an oblique or transverse diameter, the blades must be applied to the sides of the child's head and face.

Traction to bring the part down on the perineum is generally, as in vertex cases, all that is necessary. If complete delivery must be accomplished, simply bear in mind the mechanism in these cases and apply the force in the proper direction.

How should the forceps be applied to the after-coming head in breech cases?

To the sides of the face and skull, beneath the body of the child, if anterior rotation of the head has taken place. If not, and the chin is caught above the symphysis, the body must be raised up by an assistant, the blades applied over the occipital portion of the skull, and traction made in an anterior direction (the handles being lifted toward the child's back), that the occiput may be born first.

If the chin rests beneath the symphysis, make the traction away from the back, that the face may emerge under the pubic arch first.

Never use forceps to the after-coming head until all other methods of delivery have failed.

The forceps have been, and are still by some, applied to the breech. This procedure is to be discouraged.

What are the dangers of forceps operations ?

To the Mother.—In low operations, if properly and carefully done, there is almost no risk, and much less harm can be done by their use than if the fetal head is allowed to rest for a considerable length of time in the pelvic canal. High operations are naturally attended with more dangers, but even here, if the cases are properly chosen and intelligently treated, the dangers are not great.

The unfortunate results attributed to the forceps are injuries to the soft parts and the pelvis. Among the former are lacerations of the uterus, cervix, vagina, and perineum, sometimes the bladder, urethra, and rectum, resulting in inflammatory conditions, fistulæ, and sepsis. To the pelvis both fractures of its bones and separation of the joints have occurred.

To the Child.—Abrasions of the skin sometimes occur, but are of no consequence unless they are so extensive and deep as to be lacerations. They are usually the result of carelessness or ignorance. Fractures of the cranial bones, cerebral hemorrhages, thrombosis of one of the sinuses, and death have all been caused by prolonged and severe compression.

What is the vectis ?

A short curved blade resembling one of the blades of a pair of short forceps. It was formerly used to promote rotation of the head and aid flexion, but has been entirely discarded.

What is the fillet ?

It is a loop of cloth, metal, or whalebone which is passed over the occiput or between the chin and thorax of the fœtus, so that traction may be made. It is sometimes passed over the groin. It is never used now.

EMBRYOTOMY AND CRANIOTOMY.

What is understood by these two terms ?

Embryotomy is applied in general to any operation requiring the destruction of the fœtus, whether this be a simple perforation of the skull ("craniotomy"), perforation with crushing ("cephalotripsy"), crushing the base of the skull ("basiotripsy"), or the severing of the head or mutilation of the fœtus ("decapitation," "evisceration").

Describe the instruments generally used in doing embryotomy.

(1) *Perforator.*—Many instruments have been devised for perforation

of the skull, but in a general way they consist either of a trephine with a long handle, sometimes hollow that irrigation may be resorted to and the brain-substance washed out of the skull, or of scissors. Those suggested by Smellie or some modification of them are most frequently used. They consist of a long-handled pair of scissors, the blades of which are short and triangular, the apex of the triangle being the point, and the base a projecting shoulder. The outer edge of the blades only is sharpened.

(2) *Cranioclast*.—This is a solid, narrow-bladed pair of forceps, so designed that one blade may be introduced through the perforation, the other kept outside of the skull. When both are introduced they are locked like the forceps. The internal blade is small, non-fenestrated, and convex, while the external is larger, fenestrated, and concave. When locked the former lies against the internal concave surface of the skull, while the latter lies against the external convex surface. Thus it will be seen two objects may be accomplished—simple traction, or, by a twisting movement, a breaking off of portions of the bones.

(3) *Cephalotribe*.—This is a long, solid pair of forceps with a compression-screw at the ends of the handles. The blades may or may not be fenestrated, but their inner surfaces are usually serrated, and when applied and compressed come much closer together than do the ordinary forceps.

(4) *Basiotribe*.—This instrument, first devised by Tarnier, is very complete, and consists of both perforator and cephalotribe combined in one.

(5) *Crotchet*.—This is a sharp-pointed hook which may be fastened on some portion of the skull and traction made upon the handle. It should never be used where other instruments are at hand.

State the indications for performing craniotomy.

In a general way, disproportion between the head and the parturient canal is the usual cause requiring craniotomy, and this most frequently arises from deformity of the pelvis.

The exact amount of contraction where the operation is justified in preference to Cæsarean section is such a disputed point that it is impossible to lay down any fixed rule to be followed in every case. Some fix the limits of the operation at between $1\frac{3}{4}$ and 3 inches in the internal conjugate, and others between $2\frac{1}{4}$ and $2\frac{3}{4}$. We must depend, to a large extent, upon the conditions at hand for the performance of the two operations, section or embryotomy. If, in a general way, the chances for the mother seem much better by destroying the fœtus, we should not hesitate to resort to this procedure. Other causes, such as hydrocephalus, impacted face or brow, extended after-coming head, rigid soft parts of the maternal passages, cancer of the cervix, etc., have already been mentioned. Some recommend the operation in all cases where death of the fœtus is positive, but as this is always a questionable point to decide, it is hardly to be recommended.

Describe the operation.

After the preparation of the patient, operator, and assistants, which should be just as for forceps operations, the perforator, carefully guarded by the fingers to prevent injury to the vaginal wall, is passed up to the head. Here, in vertex cases, it will come in contact with one of the parietal bones, while in face or brow presentations it should be introduced through the frontal bone, one of the orbits, or the roof of the mouth; and in case the after-coming head is to be perforated, it must be done back of the ear or to one side of the foramen magnum. Precautions must be taken not to introduce the instrument through one of the sutures or fontanelles, as the overlapping of the bones prevents exit of the brain-substance and collapse of the skull.

An assistant grasps the foetal head firmly through the abdominal wall to steady it, and the perforator, held as nearly as possible at right angles to the bone that it may not glide off, is slowly pushed through by a boring motion. When the shoulder of the scissors is reached the handles are separated. This opens the blades, making a long incision in the cranium. Closing the instrument again, it is now introduced at right angles to the former incision, and the same manœuvre repeated. Then push the instrument within the skull as far as the base, and, moving it about, thoroughly break up the brain tissue, and then withdraw it.

Many recommend that the skull should now be washed out thoroughly with some antiseptic solution before proceeding further, but this is unnecessary if the destruction of the brain has been carefully done.

The completion of the operation consists in reducing the size of the head and delivering. This is preferably done by the cephalotribe, although it may be necessary to break up the vault of the cranium somewhat with the cranioclast. The blades of the instrument must be deeply introduced, that the base of the skull may be reached, and after applying, the screw on the handles is turned slowly and the bones crushed. Delivery is then accomplished as with the forceps, though it may be necessary to remove and reapply the instrument once or twice during the operation.

As a rule, the body will offer no difficulty to delivery, though exceptionally further mutilation must be done.

What are the indications for, and the method of, decapitating?

Impacted shoulder presentation, in which the child is jammed far enough into the pelvis for the neck to be within reach.

There are many varieties of instruments in use for decapitating, but the one which has gained the greatest reputation is a curved steel hook, the internal edge of which is sharpened. This is passed over the neck, and by a backward and forward movement the head is separated from the body.

The wire *écraseur* has also been somewhat used, as has also a pair of blunt scissors. Whatever should be employed must be used with the greatest care, that injury to the maternal structures be avoided.

As soon as completely severed the head is pushed up into the uterus and the body withdrawn by dragging down upon the arm. The head remains to be delivered, and this can generally be done by crowding it down into the pelvis by abdominal pressure and applying the forceps, or preferably the cephalotribe. If not, it must be perforated, and under the circumstances the operation is not an easy one.

When should evisceration be resorted to? Describe the operation.

Occasionally after craniotomy where resistance is encountered in delivering the body, most frequently in impacted shoulder presentations where the neck lies high up beyond reach.

The most dependent part of the thorax is penetrated by a strong pair of scissors, the thoracic viscera broken up and withdrawn in pieces. Next the diaphragm is cut through, and the contents of the abdominal cavity removed. This will allow the body to collapse, and to be born as in spontaneous evolution. It is said that if the spinal column be divided with a strong pair of scissors passed through the opening in the thorax, the delivery is easier, as the child is folded as it were upon itself. For its removal the crochet or blunt hook may be used.

The dangers to the mother of any of the above-described operations are evident, unless the greatest care and antiseptic precautions are observed, when naturally they become materially lessened.

An intra-uterine irrigation of a bichloride-of-mercury solution, 1 : 5000, followed by a prolonged douche (intra-uterine) of thoroughly sterilized warm water, should be given in every case where either the hand, fingers, or any instrument has been introduced into the uterine cavity.

The *after-treatment* does not differ from that following a normal delivery.

THE CÆSAREAN SECTION AND ITS MODIFICATIONS.

What is the Cæsarean section?

It is an operation consisting in cutting through the abdominal wall and the uterus, and removing the child through the wound thus made. There are several modifications of the operation: (1) The Porro, in which the uterus is amputated, with its appendages, at the cervix, after the removal of the child; and

(2) The Porro-Müller, which is a modification of the above, and consists in lifting the uterus out of the abdominal wound, constricting the cervix to prevent hemorrhage, then incising the organ, removing the child, and amputating as in the above.

What are the indications requiring the operation?

Deformities of the pelvis, where the dangers of craniotomy would be greater to the mother than laparotomy; malignant tumors of the cervix or uterus; tumors obstructing the pelvis and rendering delivery in this way impossible; occlusions of the vagina, rendering delay dangerous or

impossible; some cases of impacted transverse presentations, with perhaps only slight pelvic deformity; death of the mother during the latter months of gestation or during labor. Children have been saved where the operation was done soon after death.

Is it possible to make a prognosis as to the result?

It is not, as the success or failure of the operation must depend upon so many conditions. The general health of the woman, the experience of the operator, the preparations and surroundings of the patient, and, above all, whether or not the operation is one of election and the time is chosen or one of necessity, make a prognosis favorable or unfavorable as the case may be.

If the patient's condition is good, the time for operating properly chosen, and the surroundings favorable, the mortality is not over 25 per cent. The usual causes of death are shock, hemorrhage, exhaustion, peritonitis, metritis, and septicæmia. There is little or no danger to the child.

When should the operation be done? Describe the simple section.

It is now generally admitted that the best time for operating is after labor has begun, for two reasons: First, the uterine contractions prevent hemorrhage; and secondly, free drainage of the lochial discharge is obtained, as the cervix is somewhat dilated. Some think it is just as well to induce labor near full term; others prefer having everything in readiness and waiting until it normally occurs.

Preparations.—The room for the operation should be large, well ventilated, and well lighted both by natural and artificial lights, as it may be necessary to operate at night. All furniture is to be removed, and the floors, walls, and ceilings washed with a 1 : 500 solution of bichloride of mercury.

As term approaches, provided it has been decided to defer the operation until this time, the patient's bowels must be kept open by the use of laxatives or enemas, and some mildly antiseptic vaginal douche given once daily.

As soon as labor begins the abdomen and suprapubic regions must be shaved, thoroughly scrubbed with soap and warm water, afterward washed with alcohol and ether, and then with a solution of bichloride, 1 : 1000. A large folded compress of gauze, sufficient to cover the entire abdomen, is wrung out of the same solution and held in place by an abdominal binder loosely applied. This will not be removed until the first incision is about to be made. Always pass the catheter the last thing before the operation is begun. The anæsthetic to be given is a matter of choice. Many prefer chloroform, as there is much less danger of vomiting afterward. At least two or three assistants are needed, besides the one administering the anæsthetic.

Plenty of sterilized hot water must be at hand, as well as ice, alcohol,

etc., for resuscitating the child. The instruments, sutures, needles, etc. must be carefully sterilized and kept submerged in a 2½ per cent. solution of carbolic acid.

The operator stands on the patient's right side, one assistant at her left, another at the foot of the table, and if a third be at hand he will pass instruments, needles, etc. Begin the operation when the cervix is slightly dilated.

The Operation.—With a scalpel the abdominal incision is made in the median line, to extend from an inch or two above the umbilicus to within the same distance from the symphysis pubis. The skin and fasciæ are cut until the peritoneum is reached. All bleeding must now be stopped by clamps, and ligatures if necessary. An opening is then made in the peritoneum, the first two fingers of the left hand passed through it, and, using them as a guide, this is opened throughout the length of the abdominal wound with a pair of blunt-pointed scissors.

The parts now retract over the uterus, exposing this organ. Towels wrung out of hot water must be placed around the wound, and the assistant places a hand on each side of the uterus to steady it and hold it up in apposition with the abdominal wound while the operator opens it. Some rupture the membranes *per vaginam* at the beginning of the operation, while others do it through the incision. An opening is now made in the median line of the uterus, and the incision extended with scissors, following the same method pursued in dividing the peritoneum. The membranes are ruptured, if this has not already been done, and the child lifted out and given into the hands of an assistant. The cord is then clamped and cut.

The placenta may become detached as contraction occurs, or may have to be removed. In either case the cavity of the uterus is sponged out and the sutures introduced. About this time a full dose of ergotin should be administered hypodermically. It sometimes happens in opening the uterus that the placenta lies immediately beneath the incision, in which case we may cut directly through it. Hemorrhage will be more profuse, but generally controllable. It rarely becomes so free as to necessitate the use of styptics.

The uterine wound is closed by two lines of sutures. Silk, wire, and catgut are all used, but preference is given to the first. The deep sutures are passed through the muscular tissue down to the mucous lining, about $\frac{1}{3}$ to $\frac{1}{2}$ an inch apart, and in each interspace is placed a superficial suture.

The abdominal cavity must now be cleansed with sponges, and the wound in the abdominal wall closed. This may be done either with silver wire or silkworm gut, as after an ordinary laparotomy or ovariectomy. The external dressing consists of dusting the wound with iodoform, covering it with a strip of iodoform gauze, and over this bichloride gauze, absorbent cotton, and a binder to hold the dressing in place.

The *after-treatment* consists in absolute rest in the dorsal position, morphine hypodermically to relieve pain and restlessness, small quantities of cracked ice, water, and iced champagne at frequent intervals, and

catheterization every six or eight hours. At the end of twelve hours, if there be no nausea or vomiting, peptonized milk, beef tea, or mutton broth may be given in small quantities. After two or three days the bowels may be moved by an enema of soapsuds. If no unfavorable symptoms occur, the dressing should not be removed for ten or twelve days, when the sutures are taken out.

Describe the Porro operation.

In this operation the same course described above is pursued until after the removal of the child and secundines. When this is done the uterus is lifted out of the abdominal cavity, an elastic tubing passed around the cervix and tightened until all hemorrhage has ceased, and then amputated just above the ligature, the stump drawn up through the wound, cauterized by the Paquelin cautery, and fastened in the abdominal wound either by sutures or pins.

Describe the Porro-Muller operation.

This differs from the former only in one way; that is, the lifting of the uterus from the abdominal cavity before incising. This is done that all possibility of the escape of fluid into the peritoneal and abdominal cavities be prevented. As soon as lifted out hot towels are wrapped around it, and sponges placed about the wound to absorb all fluids (liquor amnii and blood).

Many in the simple section resort to this procedure, afterward replacing the organ in the abdominal cavity.

What is Sanger's method?

Abdominal incision as described; then lift the uterus from the cavity, apply two or three sutures at the upper angle of the abdominal wound to close it about the uterus, and make compression at the cervix. The organ is then opened and the child removed. The peritoneum is now dissected from the muscular edges of the uterine wound, and a long, narrow, wedge-shaped piece of tissue taken from the muscular coat. The peritoneum is then turned down over the muscular layer and deep sutures introduced. Then the serous surfaces of the peritoneum are brought together by superficial sutures.

The choice of operation must depend entirely upon the condition of affairs present and the judgment of the operator.

What can you say of the post-mortem Cæsarean section?

It should be done in every case of death of mother after viability of the child if it can be done soon after death. The probabilities are that if half an hour or more has passed the foetus will have perished.

Describe laparo-elytrotomy.

It is an operation by which the child is delivered through the abdomen of the mother by way of the cervix and upper part of the vagina. The incision is made in the lower part of the abdominal wall, and the peri-

toneal cavity is not opened. The primary preparation of the patient is to be as for the Cæsarean section. The os must be fully dilated.

An incision is made on the right side parallel with Poupart's ligament, and about 5 inches in length, passing from $1\frac{3}{4}$ inches above and to the outside of the spine of the pubes to the same distance above the anterior superior spinous process of the ilium. The muscles are carefully divided and the peritoneum exposed. This is gently loosened from the fasciæ and lifted upward. The vagina then becomes exposed as the peritoneum and intestines are held away by an assistant. Another assistant draws the uterus to the left, so that the right side of the vagina is exposed. A third introduces the female catheter into the bladder "as an indicator and to lift the viscus from the vagina." A blunt wooden rod is passed into the vagina, and by it the wall is pushed up into the incision. An incision is now made in the vagina over the rod with a thermo-cautery, a galvano-caustic knife, or a small puncture with the bistoury is enlarged by tearing with the fingers. The catheter is now removed and the membranes ruptured. Delivery may take place through the wound by contractions of the uterus, but will usually have to be accomplished by version or the forceps.

The placenta is delivered by Credé's method. The uterus and vagina are now thoroughly irrigated, and the abdominal wound closed and dressed antiseptically.

This operation has been little done during the past few years, since the Cæsarean section has become so much more successful.

What is symphysiotomy?

It is an operation devised by Sigault of Angers, and consists in a division of the symphysis pubes, that the bones may separate sufficiently to allow the passage of the head. Little space is gained by the operation, and under no circumstances is it ever indicated.

TRANSFUSION AND INFUSION.

What is transfusion of blood? and when is it indicated?

It is the act of passing blood from one person or animal into the veins of another, and is indicated as a last resort in cases of severe hemorrhage.

The transfusion may be direct from the vein of the donor to that of the receiver, or it may be first drawn and afterward injected. If the latter is done, something must be added to the blood to prevent coagulation, or it must be defibrinated by beating and then strained, that only the fluid part may be injected.

Describe the process of direct transfusion.

Numerous apparatuses have been devised for this purpose, but all are open to criticism.

Aveling's apparatus has probably been more generally used than any

other. It consists of a small bulb syringe without valves and having a silver canula at each end. One is inserted in one of the veins of the arm of the donor (usually the median basilic), the other in the corresponding vein in the arm of the receiver, and the blood carried from one to the other. Transfusion from artery to artery has also been done. The current is apt to be sluggish and perhaps coagulate, the physician usually inexperienced, and for this reason direct transfusion is not often done. More frequently is the blood withdrawn, defibrinated, heated to the proper temperature, and then injected.

The injection of warm fresh cow's milk into the veins in cases of hemorrhage has also been used, but without any great success. This is called infusion.

What is infusion ?

The passing into the circulation of a saline solution of milk through one of the veins. It is indicated in the same cases in which transfusion is done, and has met with more success than it. Little's solution, which is often used, is made up of—

Chloride of sodium,	℥j ;
Chloride of potassium,	gr. vj ;
Phosphate of sodium,	gr. iij ;
Carbonate of sodium,	gr. xx ;
Water,	℥xx.—M.

This must be heated to a temperature of 99° or 100° F., and 10 to 12 ounces at a time slowly injected into one of the veins of the arm, care being taken that no air enter with it.

CHAPTER VIII.

PUERPERAL DISEASES.

PUERPERAL INFECTION.

How may puerperal infection manifest itself ?

As an infectious disease with violent constitutional, but no marked local, symptoms. or with less marked constitutional, but severe local, symptoms, or both may be greatly developed. Septicæmia and childbed or puerperal fever are names usually given to the disease when the constitutional symptoms predominate, while if local symptoms are marked it becomes a puerperal or septic peritonitis, metritis, endometritis, phlebitis, etc., as the case may be.

When does infection usually take place? and how?

Usually within the two or three days following confinement, though cases do occur as late as twelve days. However, if seven or eight days be passed free from infection there is good reason to believe that it will not occur.

The point of infection may be at the vulva from abrasions or lacerations in this vicinity, within the vaginal canal, at the cervix, or in the uterus. When infection takes place within this organ, it is at the site of placental attachment. The poison enters through freshly-wounded surfaces; therefore the dangers are over when these are covered by granulations, as such a surface is non-absorptive.

What is the poison causing infection? and how carried?

It is now considered to be the same as that which produces septicæmia or pyæmia in ordinary surgical cases, and is a micrococcus or germ. Formerly the cases were classified as *heterogenetic*, or those in which the poison was introduced from without the body, and *autogenetic*, when developed within the body of the woman. This distinction is not now generally admitted, as no poison can be formed within the woman without some infective germ entering from outside the body. This poison may arise from decomposing organic matter or tissues, putrefactive changes without or within the body, cadaveric poison, and probably from many of the zymotic diseases.

The pregnant woman is very liable to infection, both from her condition during gestation and the exhaustion (and perhaps anæmia) following delivery. The infection is most frequently carried by the doctors, nurses, or midwives on the hands or instruments, though it may reach the parturient canal through the air in lengthy exposures of the vulva during the changing of the vulvar pad or the use of the bed-pan.

PATHOLOGY.

What can you say of the pathology of the following diseases?

Of Vaginitis.—There is a swelling and extreme tenderness of the vaginal mucous membrane, associated with heat, redness, and a purulent discharge. There may be areas of necrotic or ulcerative tissue, and these are sometimes covered by a diphtheritic membrane. Or this membrane may appear on an apparently healthy, unabraded surface.

Of Endometritis and Metritis.—As a rule, both occur together. The endometrium is swollen, red, and may contain areas of ulceration. The discharge from the uterus is putrid and offensive. The organ itself is enlarged, and its muscular tissue infiltrated with pus, or it may contain gangrenous areas, or be the seat of diphtheritic deposits.

Of Cellulitis.—Any of the connective tissue about the uterus may become the seat of inflammation. It is swollen and infiltrated. Some localized peritonitis is generally associated with it, and adhesions form. It may resolve without the formation of an abscess, but many times does

not. This abscess may point and open in some portion of the vagina, in the bowel, or in the bladder, or it may open externally in the groin or through the abdominal wall.

Of Peritonitis.—It may be general or local. In the latter case it is usually associated with inflammatory conditions of some of the pelvic organs, and is confined to the pelvic peritoneum. The membrane is thickened, and small areas are covered with a fibrinous exudate. The intestines or pelvic organs may be bound together, and in the cavity of the peritoneum is found a purulent or serous fluid.

Of Phlebitis.—The veins—perhaps of the uterus, possibly elsewhere in the body—become thickened and their inner surface roughened. Thrombosis occurs, the clots may become disorganized, and pus is formed, or, as sometimes happens, the clot becomes organized, forming new connective tissue. When pus is formed, it may be carried by the circulation to other parts of the body, causing the same process to be gone through here. These are the so-called pyæmic abscesses, which are most frequently found in the lungs, joints, liver, kidneys, spleen, and heart.

Of Acute Septicæmia.—Death in these cases usually occurs so rapidly that none of the changes already described will occur. The only thing found is the morbid condition of the blood. It is dark in color, thin, and does not readily coagulate. The red cells are diminished in number, while there is an increase of the white. It may have an offensive odor.

SYMPTOMS.

Describe the symptoms of puerperal infections.

Depending upon the severity of the infection and the parts or organs involved, the *symptoms* vary. In acute septicæmia, without local inflammations, there occurs shortly (within a few hours or a day or two) after labor a violent chill, followed by a rise of temperature to 103°, 104°, 106° F., or even higher. The face is pale and anxious, the tongue heavily coated, and moist at first, soon becoming dry, brown, and hard; the pulse is rapid, feeble, and may be irregular. There is no abdominal pain or tenderness, and maybe no tympanites. The respirations are rapid and shallow, and there is generally a severe diarrhœa. Delirium, stupor, or coma may follow, ending in death. The urine is scanty in amount, contains albumin, and perhaps some hyaline casts. The lochia may be suppressed or may be of a dark color and extremely offensive. Vomiting may or may not be present. The secretion of milk, if this has begun, is arrested. Death generally occurs within a short time, though occasionally the patient passes into the typhoid condition and lingers for a week or two.

With any of the local manifestations all the above symptoms *may* be present, though usually not as markedly developed.

Vaginitis.—Constitutional: Chill or chilly sensations; temperature

102° to 104° F., and usually higher evenings; pulse rapid; loss of appetite; headache; maybe nausea and vomiting.

Local: Swelling, redness, and pain; painful micturition and defecation; lochial discharge offensive; ulcers or diphtheritic membrane in some cases.

These cases may be very mild, under which circumstances the temperature slowly falls, constitutional symptoms disappear, and recovery takes place within a couple of weeks; or they may be very severe, in which case there is likely to be a sloughing of the entire vaginal canal before death occurs.

Endometritis and Metritis.—Constitutional: Chilly sensations, or these may be absent; moderate rise of temperature, 101° to 103° F.; loss of appetite, coated tongue, and headache; pulse slightly accelerated. There may be diarrhœa.

Local: Pain and tenderness over the uterus; enlargement of this organ; cervix patulous and œdematous; lochia bright-red and offensive. If necrosis of the tissues occurs or a diphtheritic process be present, the symptoms are much more severe.

Cellulitis.—Constitutional: Chill generally, but perhaps only cold sensations; temperature 102° to 105° F.; pulse rather rapid; headache, anorexia, and prostration; maybe vomiting and diarrhœa.

Local: Pain generally to one side of the uterus, and sometimes extending down the thigh; lochia normal or fœtid. On vaginal examination a swelling is found on one side of the uterus, occasionally pushing this organ to the opposite side. The uterus is large, and when moved severe pain results. The leg may become œdematous. This condition either goes on to resolution or an abscess forms, perforating as mentioned. The opening may now close or a sinus remain.

The differential *diagnosis* between this condition and pelvic peritonitis is always very difficult. Cellulitis usually begins on one side only, and extends downward by the side of the vagina, while a peritonitis is most frequently found posteriorly in Douglas's pouch.

Peritonitis.—(1) *General.*—Constitutional: Severe chill, followed by temperature of 103° to 105° F.; pulse very rapid, thready, and usually high-tensioned; respiration rapid and shallow; tongue coated, dry, and brown; face flushed and anxious; thirst excessive; vomiting, almost continuous, soon becomes greenish, and maybe fecal. Diarrhœa generally not marked. The urine is scanty, high-colored, and contains albumin; may be suppressed. Hiccoughs constantly. Pain is constant, excruciating, and confined to the abdomen. Patient lies on her back with the knees drawn up. There may be delirium or stupor preceding death.

Local: Tympanites general and marked, lochia suppressed, or may be present, and fœtid; the vagina is hot and dry.

(2) *Local.*—All the above symptoms may be present, but generally not to such a marked degree. The lochia will be scanty, and usually offensive. Pressure in one of the vaginal fornices elicits severe pain, and often late in the disease the pelvic organs are found matted together.

Phlebitis.—Chill; rise of temperature, 101° to 103° F., then a profuse perspiration. The temperature assumes a remittent character. The pulse is accelerated; tongue coated; anorexia; headache; diarrhoea.

These may be all the general symptoms developed, unless an infective thrombus or pus is carried to some other part of the body. In this case pyæmia results. Chills are frequent and terrible, and always followed by a high temperature, 104° to 110° F.; sweating profuse; pulse small, rapid, and feeble; tongue brown; pain in some of the joints, associated with swelling, redness, and œdema. The presence of pus here may cause fluctuation, delirium, stupor, or coma. Symptoms referable to special organs may be present as these become involved. Thus we find pneumonia, endocarditis, pleurisy, pericarditis, nephritis, etc.

Is the prognosis always unfavorable in puerperal infection?

It is not, though it must necessarily cause very grave anxiety on the part of the physician. In the acute form of septicæmia recovery is very rare. If the constitutional symptoms are not severe, we have reason to believe that the infection is not great, and hence our prognosis must be more favorable.

The prognosis of cellulitis, local peritonitis, vaginitis, and metritis is best. The most unfavorable symptoms are uncontrollable vomiting or diarrhoea, a very rapid and feeble pulse, high temperature, extreme prostration, and a very offensive lochia.

What is the treatment?

(1) *Prophylactic*.—This consists in paying the strictest attention to cleanliness and antisepsis during labor and the puerperal state, and to the proper selection of the room, bed, bedding, etc. for the confinement and the puerperal state. All these have been spoken of. Do not attend a confinement when caring for a septic or contagious case.

(2) *Curative*.—First, bear in mind the fact that infection has entered the system in some way, and if possible learn how, that further absorption may be prevented. Secondly, sustain the vitality of the patient by proper food and stimulation until the effects of the poison have passed off.

If the slightest rise of temperature occurs in the puerperal woman, or if the lochial discharge acquires the faintest odor, make a thorough examination. Find out whether there be any tenderness over the abdomen, and examine the vulva for a pathological condition here. Such an examination revealing nothing, a vaginal examination is not indicated, and the condition should be treated by mildly antiseptic vaginal douches every two or four hours until the temperature falls, which will usually occur within twelve or twenty-four hours. If the symptoms do not subside, the treatment must be more energetic and thorough. Abdominal pain and tenderness, or local pain referred to the vagina or iliac regions, will

soon be developed, accompanied by more marked constitutional disturbances.

If the *vagina* alone is involved, douching is all the local treatment indicated, unless it becomes diphtheritic, in which case cauterization must be resorted to. This may be done with a strong solution of chloride of zinc. Afterward continue frequent irrigation with a 2½ per cent. solution of carbolic acid or creolin. As soon as fresh patches are found they are cauterized. Between the douches an iodoform suppository containing 5 or 10 grains should be introduced.

When the *uterus* is involved the first indication is to see that it is empty. For this purpose an anæsthetic is administered, the fingers, or whole hand if necessary, introduced, and the organ completely emptied of any foreign matter. If enough dilatation of the cervix for this procedure is not present, a dull wire curette may be used. Following this an intra-uterine douche is given. Carbolic acid, creolin, or bichloride of mercury may be used. If the latter, the solution should not be stronger than 1 : 8000, and should be followed by a thorough irrigation with sterilized water. A long strip of iodoform gauze is then introduced lightly into the cavity of the uterus, and allowed to remain until the next douche is given, or an iodoform suppository may be used. It frequently happens that another intra-uterine douche is not necessary, though sometimes douches must be given as often as every four or six hours. If this be the case, bichloride should not be used. To relieve the pain and inflammation nothing is as satisfactory as cold. This is preferably applied by the ice-coil or bag.

In case a cellulitis is present, the same indications for treatment exist as above described, though frequent warm vaginal douches must be given until resolution is complete, and to aid this. When this condition assumes a subacute or chronic form the vaginal vault may be painted with tincture of iodine every other day. If an abscess forms, it must be opened. For a peritonitis the uterus should be first thoroughly cleansed. Repeated irrigations are not indicated. Cold externally and opium hypodermically or by the rectum are indicated, as in a peritonitis occurring under other circumstances. Phlebitis calls for the treatment already described.

The nourishment of the patient is often very difficult, owing to the severe vomiting. Peptonized milk, beef juice, and mutton broth may all be given. Rectal alimentation may become necessary. Brandy or whiskey is indicated from the beginning. A half ounce every three or four hours may be gradually increased as the circulation demands it. In combination with the alcohol, digitalis, strophanthus, caffeine, strychnine, carbonate of ammonium—in fact, any of the cardiac stimulants—may be given. Quinine should be given in 5- or 10-grain doses every four or six hours. Morphine, to relieve pain and vomiting as well as the diarrhoea, is always indicated. It may be given hypodermically, combined with atropine. Mustard pastes, iced carbonic-acid water, bismuth, dilute

hydrocyanic acid, creasote, carbolic acid, may all be tried if vomiting is excessive.

To reduce the temperature sponge-baths of cold water, alcohol, and hot water equal parts, or the cold pack, may be used.

In pyæmia the abscesses must be opened, drained, and treated antiseptically as they occur.

PHLEGMASIA ALBA DOLENS.

What is phlegmasia alba dolens? and when does it usually occur?

It is a swelling of one of the lower extremities, owing to the formation of a clot in the veins of the limb, or of the pelvis, and this is an interference with the return circulation. It usually occurs within two weeks after confinement, generally not before the end of the first week. The affection is also called peripheral venous thrombosis, crural phlebitis, milk leg, etc.

What is its pathology?

This is disputed. Many think it may be due either to septic infection or is of non-septic origin. In the former case it is believed to occur with a phlebitis, or if it occurs without infection it is the result of detachment of portions of the coagula at the utero-placental site. It occurs more frequently in multiparæ and after abortions or severe hemorrhages.

Describe the symptoms.

The first *symptom* is an uncomfortable feeling of the limb or pain, usually referred at first either to the groin or popliteal space. Soon it becomes very severe, and slight pressure over any of the venous trunks produces a sharp exacerbation of the pain. The limb now begins to swell, the enlargement beginning in the groin and extending downward, or in the calf of the leg, extending upward. The skin acquires a tense, white, shining appearance, and oftentimes the veins may be felt as hard, cord-like masses under the fingers.

Constitutional symptoms may be severe or only slightly developed. There is generally a feeling of malaise, followed by chilly sensations and a rise of temperature to 101°–103° F. The pulse is accelerated, and the patient complains of headache, anorexia, thirst, and sleeplessness. In the mild cases the above are but slightly developed, if at all.

What are the prognosis and treatment?

The *prognosis* is usually very favorable. The acute stage lasts but a few days or a week, when the pain becomes less marked, swelling is diminished, and by the end of four or five weeks recovery is complete. The limb, however, rarely regains its normal size, but always remains slightly enlarged.

Treatment.—Absolute rest and slight elevation of the limb constitute our local treatment. The leg should be wrapped with cotton from the

toes to the hip and slightly elevated. If pain is severe, hot wet cloths may be placed next the skin and cotton over these.

General treatment in the way of nourishing food and good hygienic surroundings must be observed. Tonics are indicated after recovery. All active treatment in the way of massage, poultices, blisters, electricity, depletion, etc. is contraindicated.

INSANITY.

When may insanity appear during pregnancy and after labor?

(1) It may begin at any time after conception, and be but transient, or it may continue throughout gestation and after labor. The usual time of its appearance is about the fourth month. This is called the "insanity of pregnancy."

(2) The so-called puerperal insanity is some form of insanity beginning during the puerperal state. It usually appears within a month after delivery.

(3) Insanity of lactation, which may occur at any time while the woman is nursing.

State the causes.

Heredity; mental impressions; debility, exhaustion, or anæmia; septic infection; painful and prolonged labors; possibly chloroform during delivery; and many nervous disorders,—are all given as *causes*. The many accidents and disorders associated with pregnancy and parturition, such as injuries, mental disturbances, albuminuria, eclampsia, chorea, hemorrhages, etc., may all be determining causes. A large percentage of cases occur in primiparæ.

Describe the symptoms of the three varieties.

That occurring during pregnancy usually is melancholia. It may be only slightly developed, and lasts but a short time, in which case it oftentimes passes unrecognized. In these mild cases a depression of spirits with insomnia will be the only thing noticed, and generally this is attributed to grief, fright, or some other exciting cause.

Other cases become more serious from the beginning, many times continuing after delivery and assuming a maniacal tendency. There are marked depression, irritability, sleeplessness, and apprehension, usually of the approaching confinement. The woman becomes sullen and gloomy, her affections change, and interest in all matters is lost. The appearance is just as in melancholia occurring under other circumstances, and there is often a marked tendency to suicide.

After delivery the variety met with is most often of the maniacal type. It may follow a melancholia of pregnancy or begin acutely with no premonitory symptoms. This is the most frequent of the three varieties. There may be first noticed a restlessness or feeling of dislike toward husband, child, or friends, which cannot be explained, or suddenly an acute

mania is developed. The patient becomes noisy and talkative, her conversation incoherent, and often of an obscene or vulgar character. All sense of modesty and decency is lost. She has hallucinations and delusions, and both the sight and hearing may become disordered. She refuses food, is sleepless, and is extremely restless. Sometimes the disordered mind dwells on religious subjects, or the suicidal or homicidal tendency is strongly developed.

The physical condition becomes poor. There are digestive disturbances, some temperature, a rapid pulse, and involuntary evacuations of urine and fæces. Emaciation is progressive and rapid.

During lactation the melancholic type is generally seen, and most frequently in multiparæ who have borne children in rapid succession and nursed as long as this has been possible. They, as a rule, are anæmic, poorly nourished—physical wrecks.

The symptoms are such as already stated, only that hallucinations are often present, as in the suicidal tendency, and sudden violent outbreaks of acute mania may occur.

Any of these forms may result in complete recovery or may go on to dementia.

A sudden transitory mania occurring during labor is occasionally seen. It seems to bear some relation to and depend upon the severe pain. It is of but a few moments' duration.

What can you say of the prognosis?

The *prognosis* is generally favorable, at any rate as to life. Some die from either personal violence or exhaustion, while some cases become chronic or the patients are hopelessly demented. That occurring during pregnancy is, as a rule, not cured until after labor. Mania, as would be supposed, does not last as long as melancholia.

How are these cases to be treated?

The most nourishing and easily digested food must be given at frequent intervals, that the general condition of the patient may be improved. Peptonized milk, broths, beef juice, eggs, etc. may all be given. If the patient refuses to take food, gavage and rectal alimentation may be resorted to. However, this will usually be unnecessary if skilled nurses are obtained or people accustomed to care for the insane. Mild laxatives may be necessary to combat a tendency toward constipation. Fresh air, good hygienic surroundings, and careful nursing must all be obtained.

In the way of drugs, both stimulants, when indicated, and sedatives and hypnotics must be used. Morphine, hyoscine, chloral. bromides, and sulphonal may all be carefully administered. The first two are especially desirable when mania is present. During convalescence tonics in the form of iron, quinine, strychnine, and arsenic should be administered, combined with plenty of fresh air and moderate exercise. Quiet surroundings and cheerful companions are very desirable.

It may in the beginning seem best to place the patient in an asylum, though this must depend considerably upon the surroundings and circumstances, as well as the wishes of her family and relatives.

AFFECTIONS OF THE NIPPLES AND BREASTS.

What extent of injury to the nipple may occur during lactation ?

There may be a single erosion on the surface from a loss of the epithelium, due to the nursing of the child, or this may become deeper, constituting superficial fissure, or deep fissures may occur. These are of traumatic origin. Occasionally specific ulcers are found in this location, either from the bite of a syphilitic child or in a woman suffering from this disease, and rarely is found an eczematous condition of the areola and nipple.

What are the symptoms and treatment of sore nipples ?

The *symptoms* are few if unaccompanied by complicating disease of the breast. There is great pain when the child nurses, which does not entirely disappear during the intervals between nursing. This in neurotic women is apt to cause an irritable or even hysterical condition. There may be a slight rise of temperature.

The *treatment* is both prophylactic and curative. The former consists in washing the nipples several times daily during the latter months of pregnancy with some astringent fluid, that the epithelium may become hardened. A solution of tannic acid, the glycerite of tannin, dilute alcohol, brandy, solution of alum, etc. have all been used. Small nipples should be developed by drawing them out and rolling them between the fingers and thumb.

Many drugs are used to cure eroded nipples. A solution of nitrate of silver (gr. xl- $\overline{3}$ j) is one of the best. The eroded surface or fissure is touched with this, and then dusted with bismuth, and, unless the erosion be slight, the child should not be allowed to nurse for twenty-four or forty-eight hours. In this case the milk must be removed by the breast-pump. It may be necessary to repeat the application of the silver several times. Tannin is dusted over the erosion by some, and the nipple carefully covered. If the child is allowed to nurse, this must be washed off before, and reapplied after, nursing. The nipple-shield should be used in every case where the child is allowed to nurse a sore nipple.

Specific ulcers require both local and constitutional treatment. Eczema is treated as when found elsewhere.

What varieties of mastitis are met with ?

(1) Superficial or subcutaneous, in which the inflammation is just beneath the skin or areola. (2) Glandular, where the gland tissue itself is involved. (3) Subglandular, where the connective tissue between the pectoralis major and the mammary gland is involved. The second is the

most frequent of the three varieties. All may end in resolution, or supuration may occur, with a resulting abscess.

What are the causes of mastitis and mammary abscesses?

Uneven pressure over the gland in the form of improperly applied breast-binders, tight clothing, corsets, etc. is, in combination with an actively secreting gland, the most frequent cause. Infection through a fissured or eroded nipple, traumatic injury, and cold are less frequent causes. A mastitis not treated, or one in which treatment is begun late in the disease, almost invariably goes on to the formation of one or more abscesses.

Describe the symptoms.

The disease may begin insidiously or very acutely. In the former case there is a feeling of discomfort in some portion of the breast, usually near the periphery, and upon examination a circumscribed area of a hard, knotty feel is discovered. This is tender on pressure, though there is no heat or redness of the skin. By supporting the breast properly, and perhaps removing the milk by gentle stroking with the tips of the first three fingers dipped in oil and in a direction from the periphery toward the nipple, the condition is soon relieved and no symptoms follow.

If it goes on unrelieved, the pain becomes more severe, the skin reddens, is hot to the feel; there is a general feeling of malaise, with headache, thirst, and some temperature. When the inflammation begins acutely there is either a chill or chilly sensation, followed by a rise of temperature to 102° or even 105° F. This is associated with headache, loss of appetite, thirst, and a rapid pulse. The breast is painful, tender, red, hard, and swollen.

If the inflammation be superficial, there is marked redness, over a circumscribed area usually, though it may be diffuse. Pain is a constant symptom; there is some temperature and a general feeling of malaise. Resolution now occurs or an abscess forms. If the former, all the symptoms gradually disappear; if the latter, some point soon becomes more prominent and fluctuation is obtained.

In the glandular variety, which is the most frequent and occurs generally within a few weeks after delivery, there are the constitutional symptoms already described. An area of hardness, circumscribed, is found, most frequently just beyond or at the border of the areola. This is painful and very tender on pressure. At first the skin over the indurated area is normal, but it soon becomes red and hot. If resolution does not occur, there is a bulging over this area, a soft spot appears in the centre, and a rapid breaking down occurs. Some time, often three or four weeks, elapses before the abscess has made its way to the surface.

In the subglandular variety the constitutional symptoms are rapidly developed. The pain is deep-seated and of a tearing character. There is no induration of the breast nor redness of the skin, but the whole

gland appears swollen. This form almost invariably goes on to suppuration, the abscess making its way to the surface at the periphery of the gland.

What are the dangers that may arise from abscesses of the breast?

As a rule, the subcutaneous variety gives no trouble unless the inflammation becomes diffuse and assumes an erysipelatous character. In the glandular variety one abscess may follow another until the entire breast is destroyed. Septic infection may occur with any form. Carcinoma or sarcoma is frequently found in breasts which have been the seat of inflammatory conditions. Cellulitis may occur. Perforation of the chest-wall, with resulting pleurisy, has followed the subglandular variety.

How should a mastitis be treated?

If the breasts are properly supported for two or three weeks following the birth of the child by a well-applied breast-binder, and if eroded nipples are treated as soon as they are found, few cases of mastitis will arise.

The *curative treatment* consists in rest, support of the inflamed gland, and the local application of cold. The patient, if not already in bed, should be placed there, and the breast supported by a sling passed around the neck and under the gland. If much febrile disturbance is present, the diet should be restricted to milk. A saline cathartic is desirable, or a dose of calomel followed by a saline. Quinine in 5-grain doses every four or five hours should be given. Cold may be applied by the use of the ice-bag, rubber coil, or evaporating lotions. The former is generally the most convenient and best. If the nipples are not badly eroded, and if no pus is present, the child may be allowed to nurse; otherwise, the milk must be removed by gentle stroking.

When all hope of preventing suppuration is passed, this may be hastened by the application of warm flaxseed poultices. When the abscess is formed it must be opened. The subcutaneous variety simply requires a moderate incision, evacuation of the pus, thorough cleansing, and the application of an antiseptic dressing. With the glandular variety we should wait for the abscess to appear near the surface. Make a free opening, drain the cavity, and secure free exit for the pus by the introduction of drainage-tubes. Counter-openings will usually be necessary. The incisions in both the above should be made in a direction from the nipple toward the periphery, as there is less gaping and the resulting scar is smaller. Make the incision entirely within or without the areola, as the pigment will often follow the line of incision. The subglandular variety must be opened where it points, at the periphery. The incision should be free and parallel to the circumference of the breast. Use a drainage-tube. An antiseptic dressing is applied and changed once daily, washing out the cavities and shortening the tubes with each dressing.

Ether may be administered when the openings are made, but local anæsthesia with the ether spray, cracked ice and salt, or cocaine will

usually be effectual in preventing pain. During convalescence tonics are indicated.

State the method of drying the breasts when for any reason this becomes necessary.

Hot-water stupes are applied to both for half an hour or an hour, changing them every few minutes, that they may be kept hot. Following this, the entire gland is either smeared with belladonna ointment or covered with a cloth soaked in a weak solution of atropine and liquid vaseline or glycerin. Next, over the entire breasts, extending from one posterior axillary line to the other, is placed a thick layer of non-absorbent cotton and a binder is tightly applied. This need not be removed for ten days, but should be tightened a little every day as the breasts decrease in size. The bowels are to be kept open by salines, and as far as possible all fluids restricted from the diet for a few days.

CHAPTER IX.

THE INFANT.

RESUSCITATION FROM ASPHYXIA.

What is asphyxia neonatorum? and in what forms does it occur?

It is the apparent death of the newborn child. Two forms are seen—the cyanotic and the anæmic. In the former the face and lips are swollen and of a livid or bluish color; the heart beats faintly and slowly; the child generally makes feeble efforts at respiration at infrequent intervals, though it does not cry out. Slight reflexes may be present. The prognosis in this variety is good. In the anæmic form the face and body are very pale and cold, the lips and conjunctivæ bloodless, the muscles limp and flaccid, and the mouth open. There is no cardiac action, or if there is any it is almost impossible to hear it with the stethoscope, and there are no attempts at respiration.

The *prognosis* in these cases is extremely grave.

What methods are used for resuscitation?

Many times, in the cyanotic variety, all that will be necessary is a few sharp slaps on the buttocks, chest, or back either with the hand or the wet end of a towel. If this is not successful, the back and chest should be briskly rubbed with alcohol or brandy while a hot bath is being prepared. The temperature of the water may be 106° to 110° F., or even a little hotter. The cord is now ligated some few inches from the umbilicus, and, grasping it at the navel between the thumb and fingers, cut it on the umbilical side of the ligature, and allow two or three drachms of blood to escape. This often relieves the congestion and respiration

begins. If not, place the infant, after ligating the cord, in the bath, allowing it to remain but a few seconds. Taking it out, let the buttocks or back rest for a second in a basin of ice or cold water. This may be repeated three or four times, and usually with gratifying results.

Insufflation of the lungs and artificial respiration now remain to be tried if all the other methods have failed. The former may be done by introducing a catheter into the trachea—which is not an easy procedure—or by cutting a small hole in a piece of cloth, placing the opening over the infant's mouth, applying the lips to this, and gently blowing. There are a number of methods of artificial respiration.

The faradic current applied over the course of the phrenic nerves will sometimes excite respiration, and this may be tried if a battery is at hand.

In the anæmic variety do not allow any blood to escape from the cord, but, on the contrary, do not ligate it until the pulsations have ceased. The other procedures in the order described above may be tried in this variety just as in the cyanotic.

Describe the methods of artificial respiration.

(1) *Sylvester's*.—The child is laid upon its back with its shoulders slightly elevated. The physician, standing at the head, grasps the arms at the elbows and alternately raises them above the head and depresses them against the sides of the chest. This produces inspiration and expiration. This is preferable to all the others, as less exposure of the infant is necessary. While being performed nearly the entire body may be wrapped in a warm blanket.

(2) *Schultze's*.—The child is taken in both hands with the head pointing toward the operator. The fingers lie across the back at the scapulæ, with the thumbs against the sides and front of the chest. The face looks upward. Lifting it from the bed in this manner, the head and lower part of the trunk and extremities fall backward. The diaphragm is depressed, and the traction of the head elongates the chest wall. Inspiration results. Then, by swinging the child so that it doubles upon itself, the head and lower extremities fall forward, the infant rests upon the thumbs, and expiration takes place. By repeating these movements another complete respiration is produced.

(3) Direct pressure with the palms of the hands and fingers against the sides and front of the thorax.

Many other methods are described, but the above are those generally used.

What signs indicate further efforts at resuscitation hopeless?

An absence of the heart-sounds for a minute or two; no response to external irritations; absence of all reflexes.

Until all methods have been thoroughly tried, we should not cease our efforts at resuscitation, as, many times, twenty minutes or a half hour may elapse before any indications of life become apparent.

How long, after all foetal heart-sounds have disappeared from over the abdomen, there is still a possibility of reviving the infant is a question difficult to decide. If they have been previously distinct, but absent for more than five or eight minutes before birth, there is little hope of resuscitation.

NURSING.

How frequently should the infant be nursed? and when may it be weaned?

During the first month a healthy full-term child may be allowed to nurse nine or ten times during each twenty-four hours. This may be divided something after this fashion: at six, eight, ten, and twelve in the morning, and at two, four, six, and eight in the afternoon. During the night it may require one or two nursings, the hours depending upon when it awakens. It should never remain at the breast longer than *twenty* minutes, and oftentimes ten or fifteen will be sufficient.

After the first month the intervals between the feedings should be lengthened to two and a half hours, and by the end of the second month to three, with perhaps no nursing during the night—at least not more than one.

At the end of seven or eight months five nursings a day are all that are necessary.

It is difficult to know exactly the proper time for weaning the infant from the breast, but in the vast majority of cases it should be done at the end of the twelfth or fourteenth month. It may be gradually accomplished by giving the child some suitable food three or four months before nursing is stopped entirely.

DISEASES OF THE NEWBORN.

Describe spina bifida.

It is a tumor situated over some portion of the spine, and contains cerebro-spinal fluid and the meninges of the cord. It is caused by an absence of the arches of one or more of the vertebræ.

Symptoms.—As a rule, it is found as a fluctuating tumor at the lower part of the spine. It may or may not be covered by skin. On causing the child to cry the tumor enlarges, and becomes smaller on compressing it. Pressure may be followed by cerebral symptoms. Hydrocephalus is often associated with it.

Prognosis.—Grave; its termination is usually death, preceded by an ulceration of the sac, rupture, escape of the fluid, and convulsions. Cases occasionally are cured.

Treatment.—If small and showing no tendency to increase in size, simply protect it from the irritation of the clothing. If large or increasing in size, surgical interference is necessary. The sac may be punctured at one side of the median line to prevent injuring the cord, and part of

the fluid withdrawn. Then cover with a soft pad, and repeat the operation at intervals of a few days until all the fluid is removed. Iodine is injected into the sac by some. It is usual to use 1 or 2 parts of iodine, and the same of iodide of potassium, to 20 or 30 parts of water. Some of the fluid is withdrawn, the pedicle compressed, so that the iodine solution does not enter the canal, and the solution slowly injected. After remaining a short time it is withdrawn. The injection may have to be repeated several times.

Describe congenital cyanosis.

It generally begins a few hours after birth, but may not show itself for a week or more, and consists in a bluish appearance of the entire body.

Causes.—Many theories as to its etiology have been advanced. Most believe it to be due to a malformation of the heart and large vessels in its vicinity from lack of development, thus preventing the flow of blood to and from the lungs.

Symptoms.—The skin is dusky or purplish in color, and more so after exercise. At rest it assumes more nearly its normal hue; generally most marked about the face and lips. Disorders of digestion, constipation, or diarrhœa are usually present, and the child remains small and poorly nourished. The bodily temperature is almost invariably subnormal. The heart's action is usually irregular, and becomes very frequent on slight exertion. Palpitation is generally present. Irregular murmurs may be heard over the heart. The respiration is increased in frequency. There may be œdema of the limbs.

Prognosis.—Not good; most die very early.

Treatment.—Rest and quiet, good hygienic surroundings, proper clothing, nutritious and easily digested food are of most importance. Counter-irritation over the chest in the way of mustard pastes or brisk rubbing is useful. Brandy or digitalis may be of benefit. Inhalations of oxygen sometimes relieve urgent symptoms.

How would you treat an ophthalmia or purulent conjunctivitis in the newborn?

Two or three drops of a gr. v to the ounce solution of nitrate of silver should be dropped in the eye, and may be repeated once or twice daily for several days if the affection be severe. Thorough and frequent cleansing of the inflamed eye with a strong solution of boracic acid or a very weak solution of bichloride of mercury is very essential. Every twenty minutes or half an hour is not too frequent. Ice-cloths should be constantly applied. These must be changed often, that they may be kept cold. Active and thorough treatment begun in time will almost invariably result in the saving of the eyes.

Is mastitis a frequent disease of the newborn?

It occasionally occurs. The glands, one or both, become swollen, red,

tender, and hot. There is associated with the local symptoms some temperature and irritability and fretfulness of the infant. The disease usually occurs in very young infants, generally within the first two or three weeks of life.

No *treatment*, more than covering with cotton to prevent irritation of the clothing, is required. The child should never be manipulated, squeezed, or rubbed. If an abscess forms—which is exceptional—it must be opened. Use very weak solutions of carbolic acid or bichloride of mercury, as children are extremely susceptible to poisoning by these drugs.

Describe the accidents occurring to the umbilicus after separation of the cord.

(1) *Hemorrhage*.—This usually takes place at the time the cord becomes detached—namely, from the fifth to the seventh day—though it may occur at the base of the cord any time after birth. The most frequent cause is the hemorrhagic diathesis or hæmophilia. This diathesis may be due to syphilitic taint.

Symptoms.—A slight jaundice in many cases precedes the hemorrhage, which occurs as an oozing from the umbilicus. This continues until the child dies from exhaustion on account of the loss of blood, or if checked purpuric spots appear over the body. There may be hemorrhages from the nose, or into the abdominal cavity, the stomach, or the intestines.

The *prognosis* is unfavorable. Recoveries are rare.

Treatment.—Styptics may be tried: of these the liquor ferri subsulphatis is best. A piece of cotton saturated with the solution is pressed against the bleeding surface and held there for a few minutes. If this does not succeed in stopping the hemorrhage, two needles may be passed through the umbilicus at right angles and a silk suture wound around each in the form of the figure 8. These must be removed in six or eight hours and an antiseptic dressing applied. Plaster of Paris is sometimes used in this way: A thick layer is allowed to harden over the umbilicus, and then held in place by the binder. Brandy must be given in small doses as a cardiac stimulant. Even if the hemorrhage is checked at the umbilicus, it is likely to appear elsewhere, so that any treatment avails little.

(2) *Vegetations* at the umbilicus frequently appear after the cord has desiccated and dropped off. They are simply exuberant granulations, and are to be treated as such by ripping them off or touching them with nitrate of silver; or they may be tied off. Care must be taken to differentiate this condition from an umbilical hernia, which may be readily done by its smaller size, appearance, and irreducibility.

(3) *Umbilical Hernia*.—This may appear within the first few weeks of life, but usually not until later.

The *treatment* consists in the reduction of the tumor, and the application over the opening of a moderate-sized wooden button, held in place by two strips of adhesive plaster crossed in the centre.

What is icterus neonatorum ?

It is a yellow discoloration of the skin.

Causes.—Duodenitis, congenital malformation or obliteration of the bile-ducts, hereditary syphilis, and changes in the blood not well understood. It generally appears on the second or third day, and disappears within a week or ten days in the vast majority of cases.

As a rule no *treatment* is required. If evidences of syphilis are present, this must be treated, and inflammatory conditions of the duodenum—which must be extremely rare—require treatment.

What are the causes and symptoms of tetanus in the newborn ?

Bad hygienic surroundings and exposure to wet or cold are the frequent causes. The disease generally begins during the first week of life, and may be, usually is, preceded by no premonitory symptoms. The first thing noticed is an inability to nurse, and upon examination a rigidity of the muscles of the jaw is found. This extends over the body until all or nearly all the voluntary muscles become involved. Opisthotonos is generally developed, and respiration so interfered with that cyanosis results. There are periods when some relaxation occurs and the symptoms improve. Deglutition is so painful and difficult that, even though food is put into the mouth, the infant cannot swallow. Exhaustion and emaciation progress rapidly, and death follows in a short time.

Is there any treatment for the disease ?

Many remedies have been used, but none with any great success. Chloral, the bromides, or opium for controlling the spasms may all be tried. They may be given by the rectum if the child cannot swallow. Brandy to combat the exhaustion is indicated from the beginning. This is an extremely rare disease now, though some years ago it was very common.

How may septic infection enter the child's system ?

Generally through the umbilicus from inflammations and ulcerations here, or through the umbilical vein, though cases are recorded where the infections must have occurred through sores and injuries over other portions of the body.

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